December, 1949

EDISON ELECTRIC INSTITUTE BULLETIN

		Page
The Electric Industry in 1949	ELMER L. LINDSETH	433
Wisconsin Utilities Association Hears Call for Crusade Against Socialism		436
Case History of Federal Encroachment on the Electrical Industry	J. B. THOMAS	437
A. C. Spurr, Head of Monongahela Power Co., Receives 1949 Gantt Award for "Management as a Community Service"		444
The Selling of an Idea	HARLLEE BRANCH	445
The Challenge In Industrial Power Sales	ROBERT G. ELY	447
Industrial Relations Conference Program Highlights	S. F. LEAHY	450
Seminars Broaden Understanding Between Colleges and Industry	F. E. VERDIN	451
Selection and Training of Purchasing Personnel	C. F. OGDEN	453
Operating Characteristics of Heat Pump Ground Coils	DR. W. A. HADLEY	457
Personals		462
Conventions and Meetings		464

PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

September, 1948-1949

SOURCE AND DISPOSAL OF ENERGY—MONTH OF SEPTEMBER

	1949	1948	%
GENERATION* (Net)			
By Fuel Burning Plants	16,945,734,000	17,578,152,000	− 3.6
By Water Power Plants	6,975,831,000	6,034,825,000	+15.6
Total Generation	**23,921,565,000**	**23,612,977,000**	+ 1.3
Add—Net Imports Over International Boundaries	56,000,000	73,000,000	−23.3
Less—Company Use	115,047,000	110,144,000	+ 4.5
Less—Energy Used by Producer	400,462,000	360,294,000	+11.1
Net Energy for Distribution	**23,462,056,000**	**23,215,539,000**	+ 1.1
Losses and Unaccounted for	2,589,870,000	2,676,332,000	− 3.2
Sales to Ultimate Customers	**20,872,186,000**	**20,539,207,000**	+ 1.6

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS As of September 30th			
Residential or Domestic	34,916,608	33,044,035	+ 5.7
Rural (Distinct Rural Rates)	1,777,066	1,664,079	+ 6.8
Commercial or Industrial:			
Small Light and Power	5,270,668	5,113,654	+ 3.1
Large Light and Power	231,950	206,562	+12.3
Other Customers	146,121	139,471	+ 4.8
Total Ultimate Customers	**42,342,413**	**40,167,801**	+ 5.4
KILOWATTHOUR SALES—During Month of September			
Residential or Domestic	4,618,078,000	4,017,625,000	+14.9
Rural (Distinct Rural Rates)	808,966,000	733,325,000	+10.3
Commercial or Industrial:			
Small Light and Power	4,046,231,000	3,804,696,000	+ 6.3
Large Light and Power	10,158,384,000	10,720,926,000	− 5.2
Street and Highway Lighting	224,278,000	206,004,000	+ 8.9
Other Public Authorities	540,665,000	514,645,000	+ 5.1
Railways and Railroads:			
Street and Interurban Railways	273,569,000	297,478,000	− 8.0
Electrified Steam Railroads	178,790,000	194,512,000	− 8.1
Interdepartmental	45,751,000	49,996,000	− 8.5
Total to Ultimate Customers	**20,894,712,000**	**20,539,207,000**	+ 1.7
Revenue from Ultimate Customers	**$387,528,700**	**$366,155,300**	+ 5.8

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended September 30th			
Kilowatthours per Customer	1,655	1,529	+ 8.2
Average Annual Bill	$49.15	$46.18	+ 6.4
Revenue per Kilowatthour	2.97¢	3.02¢	− 1.7

(*) By Courtesy of the Federal Power Commission.

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DISON ELECTRIC INSTITUTE BULLETIN

lume 17 DECEMBER, 1949 No. 12

The Electric Industry in 1949

By Elmer L. Lindseth

President, The Cleveland Electric Illuminating Company, and
President, Edison Electric Institute

HE electric light and power industry, despite disturbing political and economic cross-currents in the ion, made noteworthy progress dur- 1949.

Generating capacity installed during year reached an all-time high.

Reserve margins of generating capac- doubled.

Record Year in Financing

Financing on the largest scale ever dertaken in any one year by the elec- companies was successfully accom- hed.

Electricity production and sales at- ned record levels.

Two million new customers were ded, almost as many as in the record r 1948, bringing the total to almost million customers. Ninety-five per t of America's occupied homes now e electric service, and it is readily ilable to all but 2½ per cent.

Earnings were improved in the face prevailing high construction and fuel ts and high wages. Rate increases, provements in operations, and greater l efficiency of new generating plants re primary factors in the gain in rnings.

Average Residential Price Down

The average price of electricity to the idential customer fell during the year m 3.01 cents per kilowatthour to the -time low of 2.96 cents.

The average overall price to all classes customers rose from 1.79 cents to 6 cents per kilowatthour, or less than per cent.

Coal consumption dropped from an rage of 1.3 pounds of coal per kilo- tthour generated to 1.2 pounds of coal per kilowatthour at the close of year, an improvement in fuel efficiency of 7½ per cent.

Installation of New Generating Capacity Reaches Peak

A major achievement by the industry in 1949 was the installation of a grand total of 6,750,000 kw of effective generating capacity, topping by 50 per cent the previous high set in 1948. Business-managed electric companies installed 80.4 per cent of the total 1949 addition, while local governmental agencies installed 8.3 per cent and the Federal government accounted for 11.3 per cent.

Reserve margins of generating capacity increased from about 6 per cent to over 12 per cent.

During the year the business-managed electric companies successfully passed the half-way mark in the financing of their postwar expansion program.

Financing the Expansion Program

In the four years ending December, 1949, about $5.8 billion were raised. Of this total about 2.5 billion came from internal sources, principally accruals to depreciation reserves and earnings retained in the business, and 3 1/3 billion from the sale of securities. Over $2¼ billion of new financing came from the sale of bonds, about 500 million from the sale of preferred stocks, and about 560 million from the sale of common stocks.

To carry out the expansion program through 1950 and 1951 as planned, an additional $3.9 billion will be required. About $1¼ billion will come from internal sources, and $2¾ billion are expected from the sale of securities.

Common stock financing met with encouraging success during the year.

Electricity Production at Record Level

Production of electricity in the United States in 1949 reached a new high of 344 billion kwhr. The electric utility industry generated 291 billion kwhr of the total produced, an amount 3 per cent greater than the 1948 record. The remainder was generated by industrial and railway plants for their own use.

Fuel was used for over 69 per cent of total generation of the industry in 1949, compared with nearly 71 per cent in 1948. The decrease in percentage generated by fuel in 1949 reflected some increase in hydro generating capacity and improved water supply.

Two Million New Customers Added

New customers continued to go on electric lines in near record numbers, the total during the year being about 2 million, compared with 2,290,000 added last year. This brought the number of customers served by the industry to nearly 43 million.

A large part of the new customers came from the continued rapid expansion in rural areas. Another large part came from the construction of new dwellings, permitting many families who had been doubling up to have individual homes.

For the United States as a whole, electrification of occupied dwellings reached 95 per cent, with electricity available to an additional 2½ per cent, making a total of 97½ per cent served or reached.

85 Per Cent Farm Electrification

In the nation's rural areas, farm electrification was proceeding at an even faster rate than in 1948. About 570,000 farms began to take service during 1949, exceeding slightly the record num-

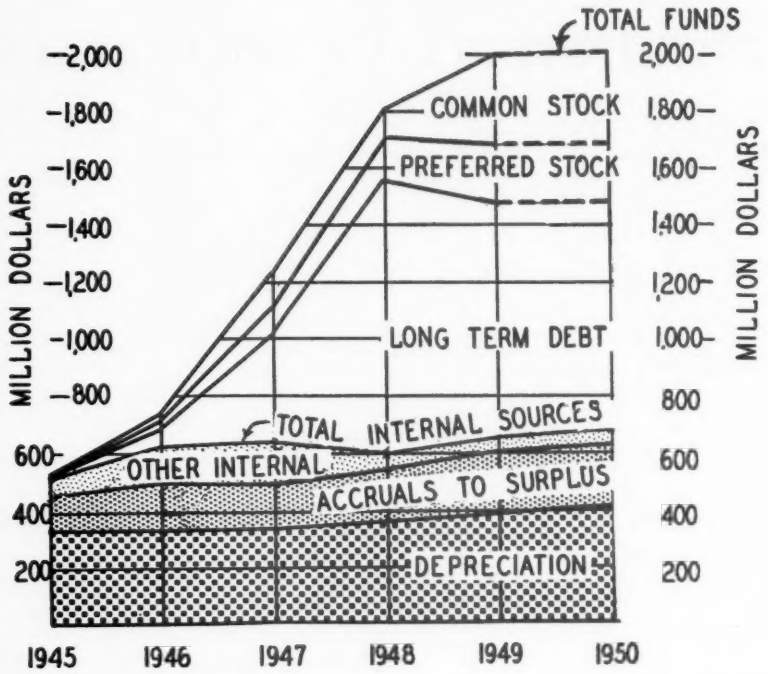

Fig. 1—Financing the Post-War Construction Program of the Business-Managed Electric Light and Power Companies

ber brought on electric lines in the previous year.

About three-fourths of the new farm customers were added on the lines of REA cooperatives and about a quarter were connected to electric company lines. The electric companies are approaching complete coverage in the areas they serve; consequently the number of farms remaining to be electrified in these areas is becoming small.

At the end of the year, 4,960,000 farms had electricity, about 85 per cent of the total, and an additional 6 per cent had electricity available nearby, bringing the percentage of farms using service, or with service available, to 91 per cent.

The average farm use of electricity jumped 200 kwhr, to an average annual consumption of 2200 kwhr.

Service to the Five Millionth Farm

Near the end of January, the five millionth American farm will have electricity. At that time the electric companies will be serving about 2,400,000 farms, REA cooperatives will be serving about 2,370,000, and municipalities and other local governmental agencies will be serving about 230,000.

According to construction programs, 92 per cent of all farms will have electricity by the end of 1950, and electric service will be available to 97 per cent of the total.

Sales Above 1948

Electric industry sales reached a new peak in 1949, totaling 249 billion kwhr, 3½ per cent over the 1948 figure.

Residential electric sales, which showed the largest annual gain yet recorded, totaled 58½ billion kwhr, increasing 15 per cent over the preceding year and more than offsetting a 3 per cent decline in industrial power sales, which totaled 121 billion kwhr.

Commercial sales were 46½ billion kwhr, a gain of 7 per cent over the 1948 figure. Sales in all other categories also moved higher, with the exception of street railways and electrified steam railroads, which marked their fourth successive year of decline.

The slight drop in industrial sales had its origin principally in the labor difficulties in the steel and coal industries.

Improvement in Gross Revenues and Net Income

The increased investment in generating plants, transmission lines, distribution lines and other facilities brought about by the expansion program, was attended by gains in gross revenues and net income.

Gross revenues of the business-managed electric companies attained a new high of $4,150,000,000, a 6½ per cent gain over the previous record-making peak established in 1948. Much of this increase, however, was offset by increased expenses.

Electric companies' aggregate net income was about $775 million, which was $105 million over the $670 million net income in 1948. By the end of the year, total fixed capital had increased by $2,075,000,000 over 1948.

The total investment in plant and equipment by the electric companies was approximately $20,000,000,000 at the end of 1949.

The rate of return on the average investment in plant and equipment during the year of $18,700,000,000 rose to 5¼ per cent in 1949, reversing a previous downward trend. This rate of return in 1948 was 5 per cent; in 1947 it was 5.3 per cent, and in 1946 5.6 per cent.

Principal Expense Items

On the expense side of the companies' ledger, wages and salaries continued to be the largest item, amounting to $870 million, 50 million more than in 1948.

Taxes, totaling $820 million, came second and showed an increase of more than 100 million over 1948.

The cost of fuel, which last year took second place, dropped again to third position, accounting for $710 million of electric expense, compared with $778 million of expense in 1948.

The saving in fuel costs, brought about in large part by the increased fuel efficiency of the new generating plants, accounted for a substantial part of the gain in net income.

Tax Payments Higher

Taxes for 1949 took about 20 per cent of the electric companies' gross revenues, as against 18½ per cent for 1948. About $465 million in taxes went to the support of the Federal government, and $355 million to the support of state and local governments.

Home Use of Electricity

Use of electricity by residential customers showed an average gain of 122 kwhr per customer, bringing the average annual use per residential customer to 1,685 kwhr.

For the fourth consecutive year, average annual increase in residential use has exceeded 100 kwhr. Ten years ago, in 1939, average annual consumption per residential customer was 897 kwhr. Twenty years ago, during the year of

Light's Golden Jubilee, average residential consumption was only 502 kwhr annually, less than one-third of the 1949 figure.

Rate adjustments, many of which had their inception in 1948, and were caused by higher costs, exerted very slight influence on the national cost of living index. The year's average index for residential electricity rose only seven-tenths of a point, from the corresponding figure for 1948.

The Cost-of-Residential-Electricity Index for 1949 was 90.1, compared with the overall Cost-of-Living Index, which had a 1949 average of 169.2. Both of these Indexes are reported by the U. S. Department of Labor.

Increasing residential electric sales brought the average revenue per kilowatthour sold for residential use down to 2.96, continuing the long sustained decline. This was five-hundredths of a cent under the 1948 figure of 3.01 cents.

Because a smaller proportion of "wholesale" industrial power was sold during 1949, and a higher percentage of "retail" residential and commercial power, the average revenue per kilowatthour for all classifications of power showed a slight increase over 1948, having risen from 1.79 cents to 1.86 cents per kilowatthour. Ten years ago, in 1939, the average revenue per kilowatthour was 2.16 cents.

Changes in Energy Sources

The uncertainty of coal deliveries resulting from interruptions of mining, together with the higher prices for mining and hauling coal, resulted in some displacement of coal in 1949 by oil and gas in the production of electric power. In consequence, the proportion of electricity generated by the use of coal declined to a record low.

The following table shows the shift in energy sources from 1948 to 1949:

Energy Sources	Energy Generated 1949	1948
Coal	46.5%	54.2%
Oil	9.0	5.9
Gas	13.6	10.7
Water	30.9	29.2
Total	100	100

The Construction Outlook

Plant expansion expenditures by the business-managed electric companies reached an unprecedented high in 1949, totaling $2,100,000,000. During 1950, a like sum, about $2,100,000,000 will be spent by these companies on new plants.

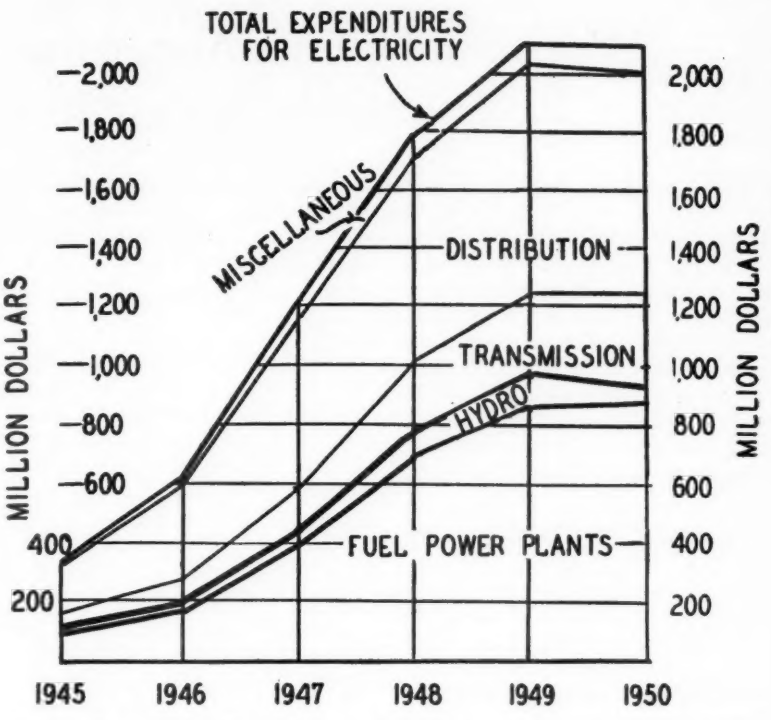

Fig. 2—Construction Expenditures of the Business-Managed Electric Light and Power Companies

According to installation schedules, effective generating capacity to be added in 1950 by the electric companies will total 5,060,000 kw, compared with an installation of approximately 5,580,000 kw in 1949. In 1951, they will add 4,850,000 kilowatts.

New capacity already installed or scheduled from V-J Day through the end of 1951 by the electric companies amounts to 21,000,000 kw of effective generating capacity, a 52 per cent increase during the period.

For the electric industry as a whole, new capacity already installed or scheduled from V-J Day through the end of 1951 totals over 26,000,000 kw of effective generating capacity, also a 52 per cent increase. The business-managed electric companies will have added 80 per cent of the total new capacity installed, maintaining the proportion existing at the beginning of the period.

Socialization by Taxation

Although the electric companies can point to a superlative record of constantly expanding service to the nation for the past 70 years, of improving efficiencies and economies, and to prices for electricity that are exceedingly low in relation to costs generally, the companies have reason to be concerned over the expansion of the Federal Government in the electric light and power business.

The persistent campaigns by demagogues and bureaucrats to socialize the electric industry is a threat to freedom of enterprise, not only in this business, but in all basic industries.

Federal Power Capacity Increase

The Federal Government, according to a report by the Hoover Commission, had generating plants as of June, 1947, with a total capacity of 5 million kw, and by 1960 will have generating capacity of about 20,000,000 kw.

The electric companies of the nation and their customers have been taxed, and are being taxed, to pay part of the cost of building and operating these Federal projects.

The electric companies are paying about 11 per cent of their gross revenues as taxes to the Federal Government. The Government power systems pay no Federal taxes. This discrimination plainly puts the electric companies at a disadvantage, and is in the direction of socialization by taxation.

It is contrary to sound principles of

(*Continued on page* 449)

Wisconsin Utilities Association Hears Call for Crusade Against Socialism

LATEST available information covering operations connected with the introduction of natural gas and dealing with present problems of electric companies was given to engineers and sales delegates of gas and electric companies and suppliers at the convention of the Gas and Electric Divisions of the Wisconsin Utilities Association, Schroeder Hotel, Milwaukee, November 21-23.

Close to 600 delegates established a record attendance. Most of the delegates who voiced their sentiments regarded the convention program as the best ever provided.

Carl A. Altenbern, president of the Association, urged all those who believe in the American Opportunity System to become crusaders in the cause to persuade people to vote for candidates for public office who state they will fight against all forms of socialization.

Voters Must Be Warned

"What," Mr. Altenbern asked, "can we do to make voters realize that our free opportunity system is being destroyed and that its destruction is against their sound self-interest?"

"First," he said, "it seems to me that everyone of us must vote; second, we must induce other people who hold our own views to vote; third, we must make supreme efforts to convince other voters that the destruction of the free opportunity system will mean the destruction of their own personal opportunities to improve their own living conditions.

"We must persuade and convince voters that government authorities are unknowingly, slyly or deliberately slipping our country into bankruptcy and socialization under masqueraded measures. Voters generally do not recognize the extent of socialization, but outspoken socialists and communists even hail such undercover accomplishments.

"We must insist that candidates make their positions on issues clear. We must not permit them to befog the issue by glittering appeals to passions and prejudice and to the all-prevailing desire to get something for nothing. We must try to make everyone realize that the overriding, transcendent, all-important issue for everyone is to decide whether or not they want to go down the road to socialization or up the road to greater opportunity and better living for themselves.

"Just a Little Socialistic"

"We must do everything we can to elect the candidates who place the welfare of our nation above the welfare of any and all self-interest groups. We must elect candidates who will not compromise on principle. We must elect candidates who are not willing to sacrifice one segment of our free enterprise system in the mistaken idea that thereby they will win votes and help save the rest from socialization. We must make people realize we can no more be just a little socialistic and not become completely socialistic any more than we can be a little pregnant and not become completely pregnant. England is presently the outstanding example."

A feature of the convention was the presentation of a citation on behalf of the Wisconsin Utilities Association to Professor Edward Bennett by G. W. Van Derzee, president, Wisconsin Electric Power Co., for his outstanding contribution over the years in the teaching and electrical engineering research fields.

Two representatives of the Public Service Commission of Wisconsin addressed the convention—John Doerfer, chairman, and George Steinmetz, chief engineer.

Too Much State Power

In a discussion of utility and regulatory matters in Wisconsin, Mr. Doerfer said, "Another problem which is of great concern to the commissioner and which should be of great concern to the people of Wisconsin is the present tendency of the Federal Government to arrogate to itself the power to regulate purely local affairs. If this development continues unchecked, we may soon find the states existing by favor of some administrative department of the Federal Government.

"Take, for example, the presently pending East Ohio case in the Supreme Court of the United States.

"The significance of the position taken by the Federal Power Commission is that once it gets its foot into the door, control by the state of purely internal affairs in the public utility field will be so emasculated that its effectiveness will be nil. At best it invites a duplication of regulation which will be both impracticable and expensive as well as utterly confusing. Worse than that, it widens the breach through which flows too much state power already. If successful, such efforts will reduce the states to grovelling puppets before a Washington bureacracy. The right to conduct the internal affairs within a state will be merely measured by the success of the beggar state's ability to wheedle favors from those in power. Control of local affairs by the people directly concerned will be gone forever."

". . . Inordinate hunger for power by a central government must be curbed by the people before it destroys them," he continued. "It is indeed a very short-sighted and dangerous policy which would persuade a public utility engaged solely in intrastate operations to seek refuge in the arms of federal control merely for a temporary advantage. Yet, that is the background of our present predicament."

Other Convention Speakers

Other Wisconsin speakers on the program included Arthur Mathias, West Allis Vocational and Adult School; Prof. H. A. Peterson, chairman, Department of Electrical Engineering, University of Wisconsin; M. W. Kyler, Wausau, vice president and general manager, Wisconsin Valley Improvement Co.; S. R. Richardson, Baraboo, president, Richardson Paint Co.; John E. Brown, Milwaukee county smoke enforcement engineer; G. V. Rork, Eau Claire, president, Northern States Power Co., and Wesley Blish, Racine, advertising supervisor, Wisconsin Gas & Electric Co.

Fifteen speakers from outside the state, nationally prominent in their respective fields also appeared on the program. They included Dr. Henry T. Heald, president, Dr. W. A. Lewis, dean of the Graduate School, and Dr. Eric T. B. Gross, all of the Illinois Institute of Technology, Chicago; Charle

(*Continued on page* 443)

Case History of Federal Encroachment on the Electrical Industry

By J. B. Thomas

President, Texas Electric Service Company, Fort Worth, Texas

An address before the American Petroleum Institute Convention, Chicago, Ill., November 8, 1949

DOWN in the Cajun country of Louisiana there is an old, old story about one of these fellows who came into a bar-room where a fight had been going on and saw his good friend lying flat on the floor with a knot over his eye, and looking pretty bad. After bending over to look at him, he sprang to his feet, beat his chest and cried, "Who hit my friend Jean Baptiste?" In a couple of seconds there turned from the bar a big six-footer, hard and rough with fists as big as hams, and said "I hit him." The newcomer looked up at the big fellow and down at his friend, and with a silly smile on his face said, "Well, you sure hit him a hell of a lick, didn't you?"

In these last few years while the electric industry has been under the attack of the socialists, the communists, the long-haired boys, the pinks, the administration in power from time to time, and others; when the companies in the TVA area were knocked flat and their business and property turned over to a government agency — when governmental agencies engaged in building flood control and reclamation projects insisted on building their own transmission systems and marketing the electrical output of the properties at prices which gave no effect to the tax burden which privately owned utilities have to pay—when an entire state was blacked out of the area in which private, taxpaying electric utilities might operate profitably—when professional propagandists on governmental agency payrolls act as agents to further governmentally financed projects—I say during this time a lot of us have stood by and said, "Well, you sure hit him a hell of lick, didn't you?"

Socialization Continues to Increase

In the meantime, the big fellow of socialization who hit our friends one by one is growing fat and strong, and with the passage of time, and helped by skillful propaganda, is able to knock down more and bigger privately owned utility groups.

In the early phases of these attacks, it was easy to feel, although not correctly, that the troubles of one company or group might be personal to their own situation and conduct, and did not justify any resentment or fighting effort on the part of others in their defense; but now with the progress made toward the socialization of this industry and the realization that it is but the first step in the socialization of the whole industry of the United States, we who carry the responsibilities for investors, employees, and customers in business should take every fair and reasonable step to protect and defend those things for which we are responsible.

Other Industries Face Nationalization

The Oil and Gas Industry, as I see it, is beginning to be faced with the same problems that began to be evident in the electricity supply industry some 15 years ago. It is the same problem that will shortly face the coal industry, the railroads, the steel industry, and one by one the other businesses of the nation, unless something is done to stop the trend.

Just as the Muscle Shoals steam plant grew to be the governmentally financed, tax-free, politically managed TVA, so can the coastal shelves, the Alaskan reserves, and other governmental steps into the oil industry become great, governmentally financed, politically managed competing oil organizations, setting the prices and calling the turn on the remainder of the private, taxpaying oil and gas industry.

Many problems face the men who have responsibilities in the development and operation of private enterprise in the United States today. The greatest of these, in my opinion, is the strong and accelerating trend toward nationalization of the production facilities of our nation. Many terms are applied to it—Nationalization, Socialization, Communism, Statism and others. Use whatever term you choose but the trend is moving toward a social and economic system where all the means of producing wealth are held or controlled by the Government; where political planning and control guide and dominate the life of the nation; where individuals may neither produce for themselves nor keep wealth and where, obviously, the personal freedom and opportunity that have made our country what it is today can no longer exist.

Government Business Puts Tax Burden on Others

It has been said authoritatively that the Federal Government owns or has investments in over 100 businesses today, totaling twenty billion dollars, and Congress has authorized fourteen billions more in that field. As each governmentally owned business becomes tax free, it leaves an increasing burden of taxes on the remaining people and businesses—the burden of taxes foregone or avoided—taxes to pay interest on the monies expended by Government—taxes to make up the losses of political operation—taxes to support more bureaus and bureaucrats—taxes to pay more political job holders.

This is one of the reasons why Federal taxes have risen from 17 per cent of the nation's tax bill in 1932 to 45 per cent in 1948, and the nation's tax bill today is 25 per cent of all our national income. This is one of the reasons why the equity capital, the risk capital, for your business and mine, is more difficult to secure year by year, and why personal savings for investment are yearly more difficult to accumulate.

Flood Control and Reclamation

In discussing governmentally financed projects, I want to make clear my own attitude about Flood Control and Reclamation projects; I think it represents that of most operating utility executives —whenever there is justification for a sound flood control, irrigation, or reclamation project which the Government should build, by all means let it be built.

Nothing is more important to this country than water for its cities and

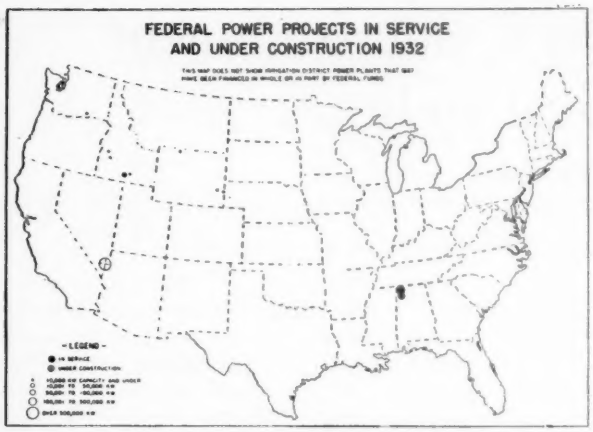

Fig. 1—Federal Power Projects In Service and Under Construction—1932.

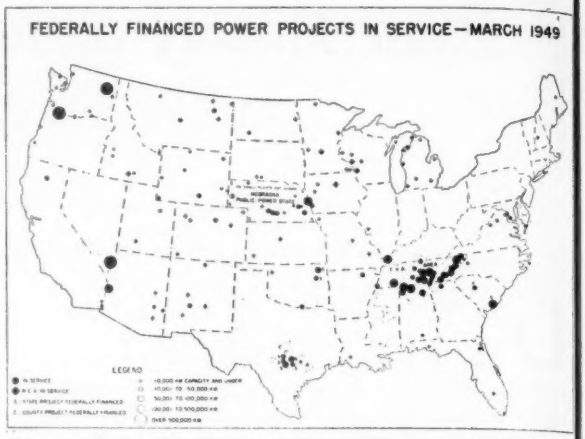

Fig. 2—Federally Financed Power Projects In Service—March, 1949.

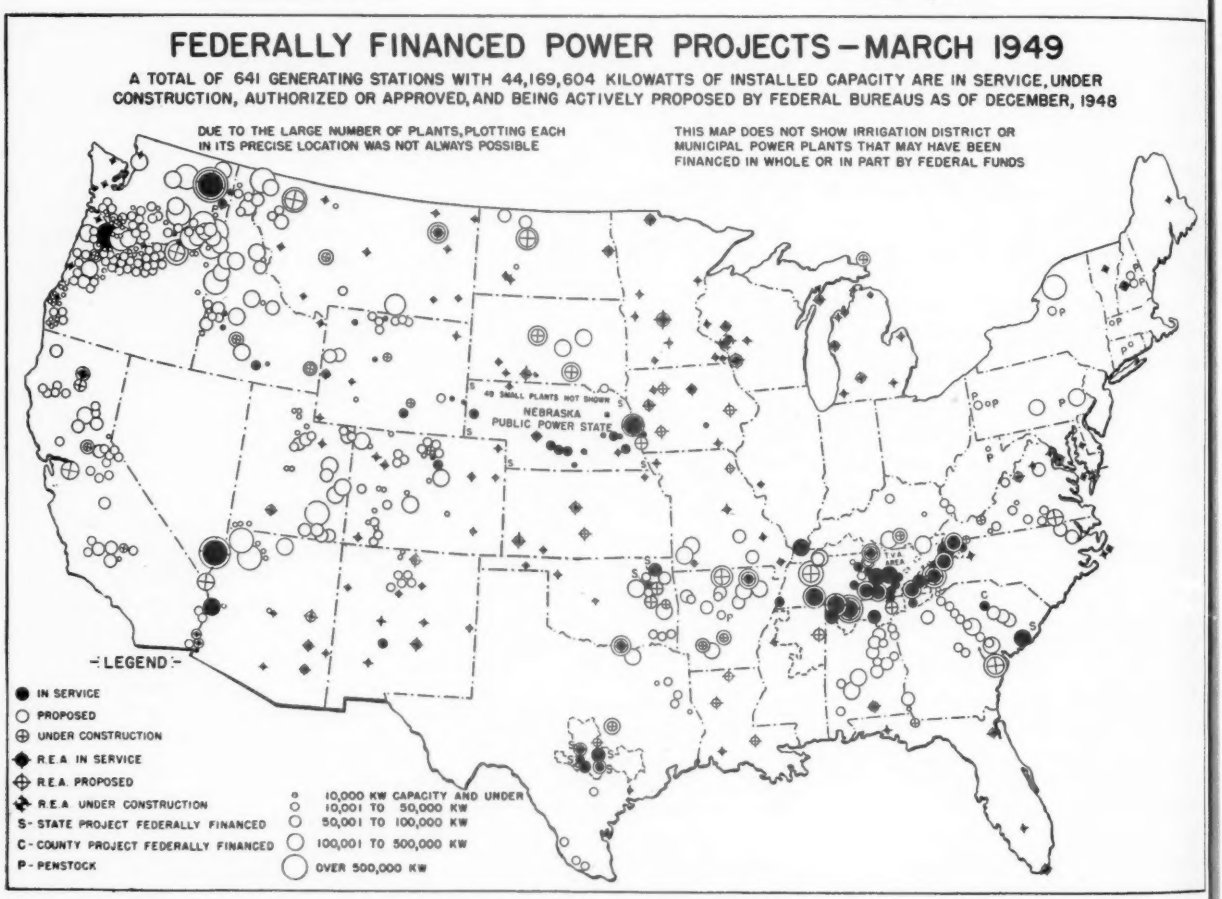
FEDERALLY FINANCED POWER PROJECTS—MARCH 1949
A TOTAL OF 641 GENERATING STATIONS WITH 44,169,604 KILOWATTS OF INSTALLED CAPACITY ARE IN SERVICE, UNDER CONSTRUCTION, AUTHORIZED OR APPROVED, AND BEING ACTIVELY PROPOSED BY FEDERAL BUREAUS AS OF DECEMBER, 1948
DUE TO THE LARGE NUMBER OF PLANTS, PLOTTING EACH IN ITS PRECISE LOCATION WAS NOT ALWAYS POSSIBLE
THIS MAP DOES NOT SHOW IRRIGATION DISTRICT OR MUNICIPAL POWER PLANTS THAT MAY HAVE BEEN FINANCED IN WHOLE OR IN PART BY FEDERAL FUNDS
40 SMALL PLANTS NOT SHOWN
NEBRASKA PUBLIC POWER STATE
TVA AREA
- LEGEND -
IN SERVICE
PROPOSED
UNDER CONSTRUCTION
R.E.A. IN SERVICE
R.E.A. PROPOSED
R.E.A. UNDER CONSTRUCTION
S- STATE PROJECT FEDERALLY FINANCED
C- COUNTY PROJECT FEDERALLY FINANCED
P- PENSTOCK
10,000 KW CAPACITY AND UNDER
10,001 TO 50,000 KW
50,001 TO 100,000 KW
100,001 TO 500,000 KW
OVER 500,000 KW

Fig. 3—Federally Financed Power Projects In Service, Under Construction, Authorized or Approved, and Being Actively Proposed by Federal Bureaus—March, 1949.

towns and farms and industries; and if there is hydroelectric power which can be generated economically at such a project, let's have a power plant with it, but let's see that the power is sold at its full value measured by the cost of other means of producing its equivalent, and the income used to benefit the project and encourage and finance more reclamation, irrigation and flood control; instead of spending additional money to build transmission lines which are generally not needed and selling the electric output of the project at less than its true cost and about half of its real value, to further, with government subsidy, more duplication of tax-paying private utilities.

Privately Owned Companies Offer to to Pass on Savings

The utilities of the country have quite generally offered to take the electrical output of multi-purpose dam projects at its fair value, building their own transmission lines to the sites, and pass on to the public, under appropriate regulatory procedure, any saving which

might result thereby. The contract between Texas Power and Light Company and the Southwestern Power Administration is a nationally recognized expression of this attitude on the part of public utilities.

REA

REA, as long as it held to its original purpose of bringing electricity to farmers who did not otherwise have access to it, did a useful job. Many of us have helped with the program and in my section of the country we sell power wholesale to the cooperatives at around 6 mills—certainly a price that is more than fair. Lately, however, the REA Bureaucracy has started supercooperatives to build transmission lines and steam generating stations, duplicating those of the privately owned companies now serving REA Cooperatives and with resulting costs higher than the charges made by the private companies for service at multiple points of delivery. The cry of power shortage in the supply of electric energy to cooperatives by privately owned utilities is generally untrue.

The Grandiose Plans

In order to bring to you the extent of socialization of this industry and the grandiose plans to complete its socialization, data will be presented, for utmost clarity, in the form of the maps and charts in the following pages.* They are based on data from recognized sources and I think you may rely fully on the facts set out in them.

The first map (not reproduced here)* shows the well-known plan of covering the entire United States by Area Authorities comparable with TVA, but in many cases greater in extent.

Federally Financed Plants, Operating and Proposed

The maps in Figs. 1, 2 and 3 show Federally financed power plants: First, as they existed in 1932; second, those actually existing and operating in 1949; and third, the actual in 1949 with those proposed, authorized, or under construction added. This last map shows that practically every area of the United States is threatened with such projects.

Fig. 4 shows, on the left, the generating capacity of the privately owned utilities operating and under construction as of March, 1949; alongside is

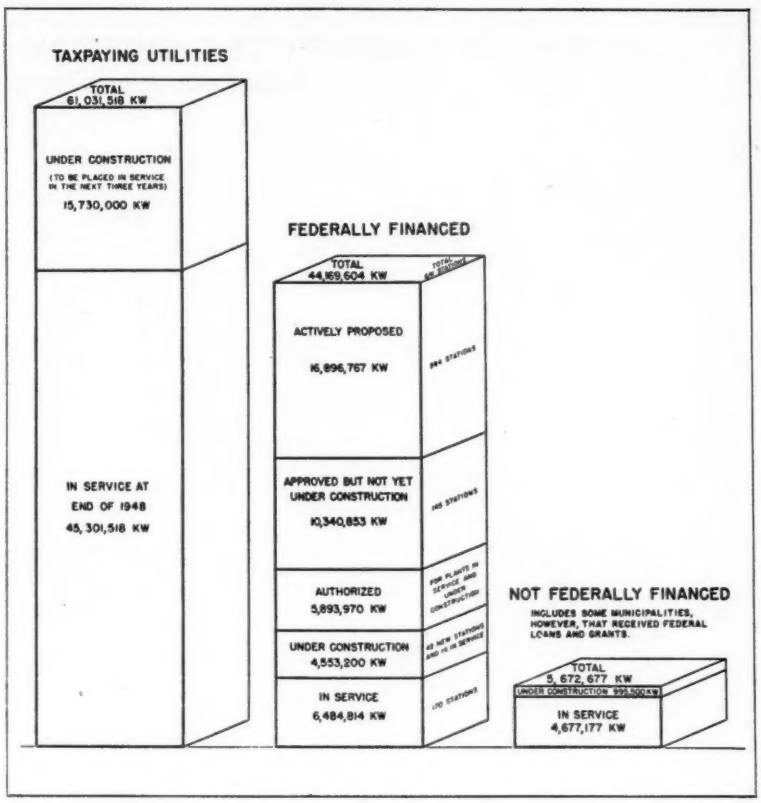

Fig. 4—Generating Capacity for Utility Service—Comparative, In Service and Under Construction—and Additionally for Federal Projects, Authorized, Approved and Actively Proposed.

shown the governmentally financed projects operating, under construction, authorized or seriously proposed. This governmental program, if carried out, will go a long way toward equaling in capacity the total resources of the privately owned electric industry in the United States.

How can you say that your own company or business is not threatened, or that the whole private enterprise system is not threatened, when you contemplate having the prices at which you sell your product and all of your commercial negotiations pitted against governmentally financed, non-taxpaying politically administered undertakings to the extent shown here? You can see on the chart how small the municipal projects are in comparison with the national totals.

Federally Financed Transmission Systems

Fig. 5 tells the story of federally financed transmission systems, actual and proposed, in 1949. Again I say, the size and extent of such a program is appalling.

The next figure (not shown) shows a smaller area and more detail. It shows the existing transmission system of the tax-paying public utilities in five Southwestern States. The area is adequately served and service is uniformly extended wherever required.

The next figure (not reproduced here) shows the overlapping transmission system proposed by the Southwestern Power Authority in its "Comprehensive Report" in which it outlined a spending program of over two hundred million dollars, exclusive of the hydroelectric dams and projects, and toward which it has received several million dollars in Federal appropriations. The proposed duplicating system will not serve any additional customers, rural or otherwise, which could not be served by the existing systems in the ordinary course of business.

By the way, this SPA which embraces some 300,000 square miles is not an authority created by Congress, which failed to pass an Arkansas Valley Authority act introduced in March, 1941, but is merely "designated" by the Department of the Interior. This method of setting up an authority without spe-

* Editor's Note: Due to limitations of space all the maps and charts discussed by Mr. Thomas, could not be presented. The speech, complete with all maps and charts, may be obtained on request from EEI, 420 Lexington Ave., N. Y. 17, N. Y.

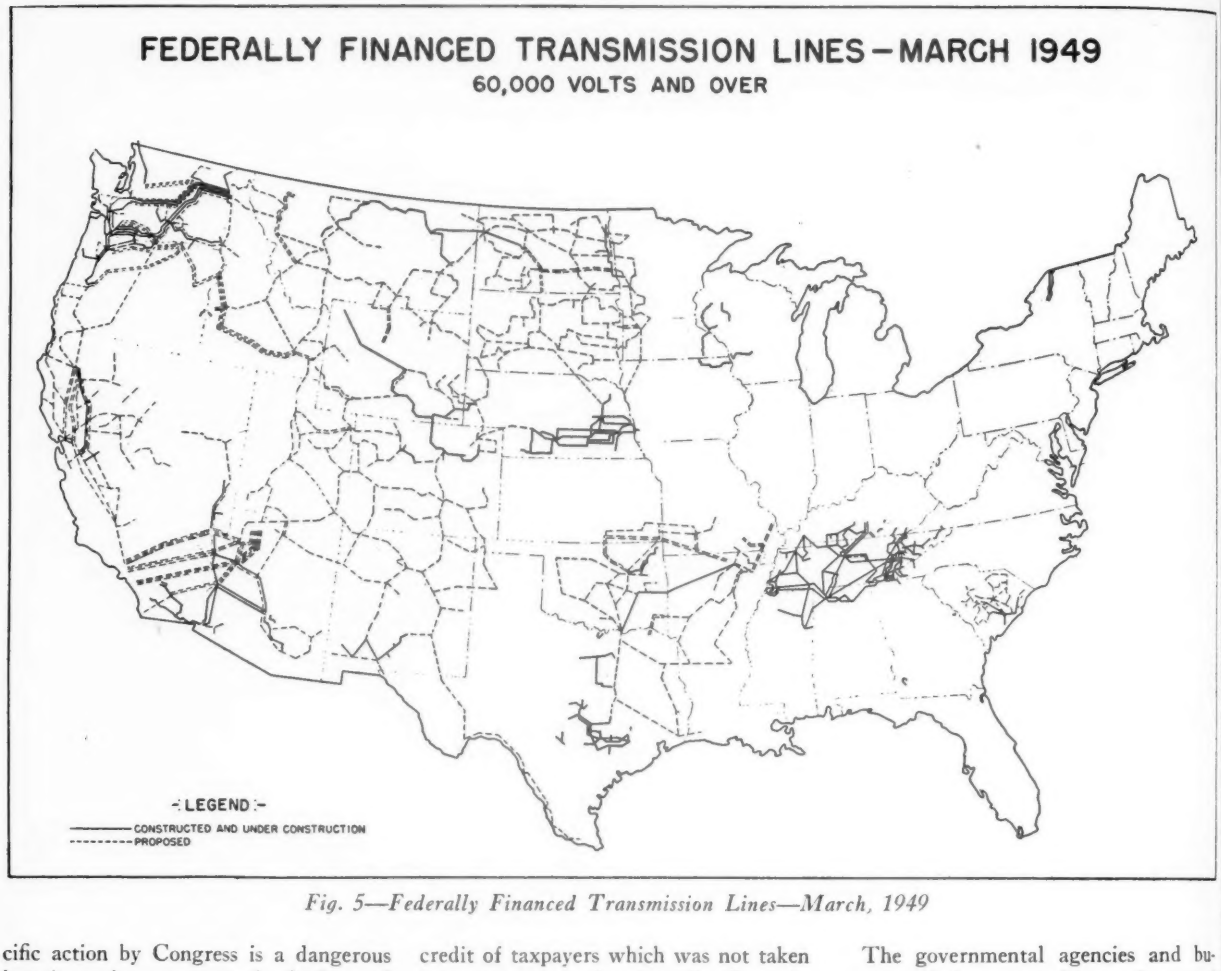

Fig. 5—Federally Financed Transmission Lines—March, 1949

cific action by Congress is a dangerous invasion of governmental checks and balances and should be opposed on every hand.

Initial Appropriations Based on False Estimates

Many of us have learned that appropriations for governmentally financed power projects are often predicated on statements which the facts have later failed to justify. The Committees of Congress who pass on them are given estimates of costs and benefits, but the original estimate and authorization requested are often not half the story. In many cases, a great deal more; and often several times the original authorization has been expended to complete a specific project.

Figs. 6 and 7 set out a number of typical examples, comparing the original appropriation with the final appropriation or estimate. Fig. 6 shows projects that are now completed or producing; Fig. 7 shows projects under construction. All of the excess shown represents money furnished by or on the credit of taxpayers which was not taken into account at the time the Committees of Congress recommended authorizations or appropriations. Of course, with the project half completed or thereabout, the Congress has little alternative but to make the additional authorization. Substantially overrunning the estimate seems to be a frequent occurrence in the development program of the governmental agencies concerned.

Now for a digression: Here is a chart, Fig. 8, to show the portion of the householder's dollar taken by electric utilities for electric service to the home, and how, over a period of years, the portion of the householder's dollar so taken has steadily declined. In the meantime, as you well know, we have furnished an increasing service both in quality and quantity, and have fully met the householder's requirements. Someone said the other day that ours is the only industry that has held onto the gold standard of dollar value. The next chart (Fig. 9) shows the increased use of service, increased personal income and decrease in average cost of service.

The governmental agencies and bureaus, and the groups that are interested in socialization of this industry are spending millions of dollars a year, most of it taxpayers' money, to propagandize the country and the particular areas in which they may be interested from time to time for government ownership, for socialization of industry, for the extension of governmentally financed, tax-free undertakings to compete with taxpaying private enterprise.

Other Federal Activities

Before speaking further on the electricity supply industry, here are some exhibits of other Federal activities that are interesting. Fig. 10 shows the lands held or managed by the Federal Government—about 25 per cent of the land area of the United States. A large part of it is administered by the same Interior Department that is so busily engaged with hydroelectric development and is so interested in the oil and gas reserves of the country.

Fig. 11 shows the type of land control and the percentages, by states.

The "Authorized" Cost—and What It is Actually Costing

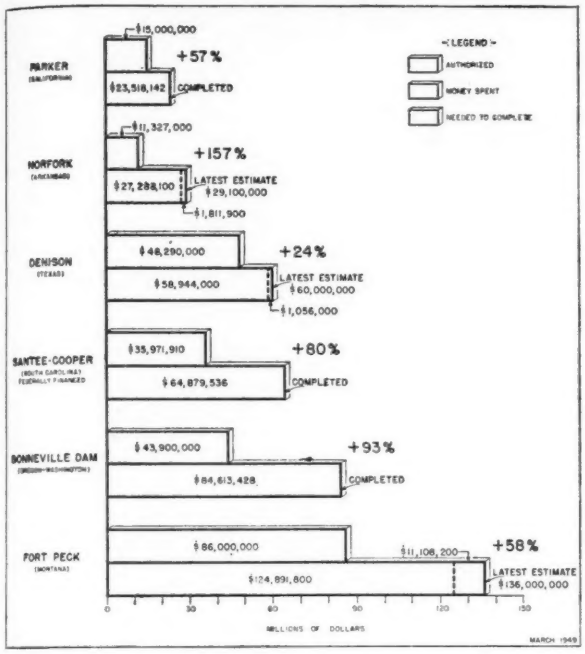

Fig. 6—Federal Power Projects In Service—Comparison Between Authorized and Final Cost.

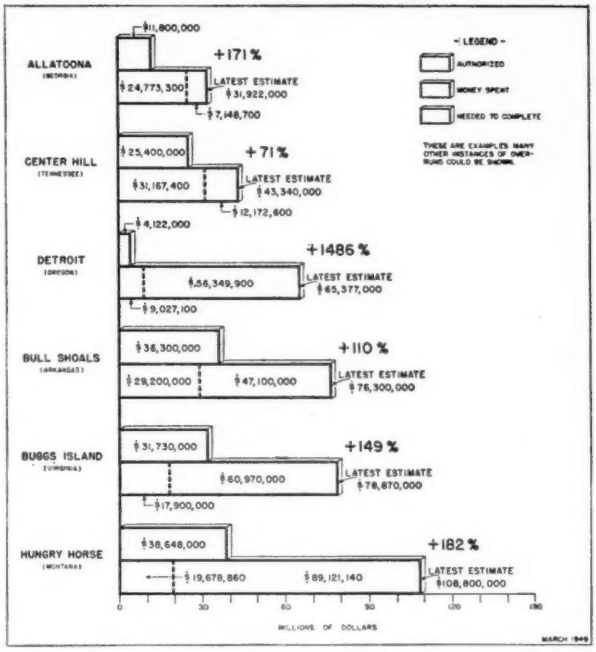

Fig. 7—Federal Power Projects Under Construction—Comparison Between Authorized and Present Estimate of Final Cost.

Fig. 12 shows the rivers of the United States that are under jurisdiction of the Federal Government.

The next map (not reproduced here) shows the Continental Shelves that the Interior Department is in way of controlling.

And Fig. 13 shows roughly all of the known oil producing and gas areas of the United States. Among these, the Government controls by leases 10,702,700 acres of oil and gas lands and has nearly a million acres of other mineral leases, permits and licenses. You form your own picture of what can happen to you.

Socialization of Industry Objective of National Socialist Party

With the picture of the nationalization of the electricity supply industry

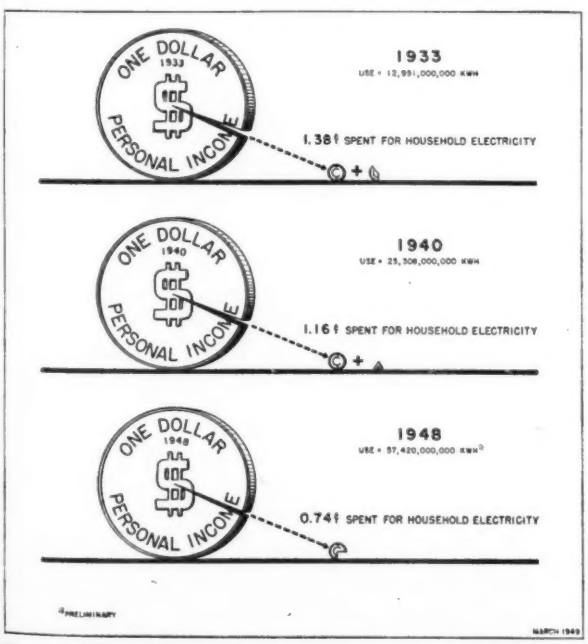

Fig. 8—Portion of Average Dollar of U. S. Personal Income Spent for Household Electricity in 1933, 1940 and 1948.

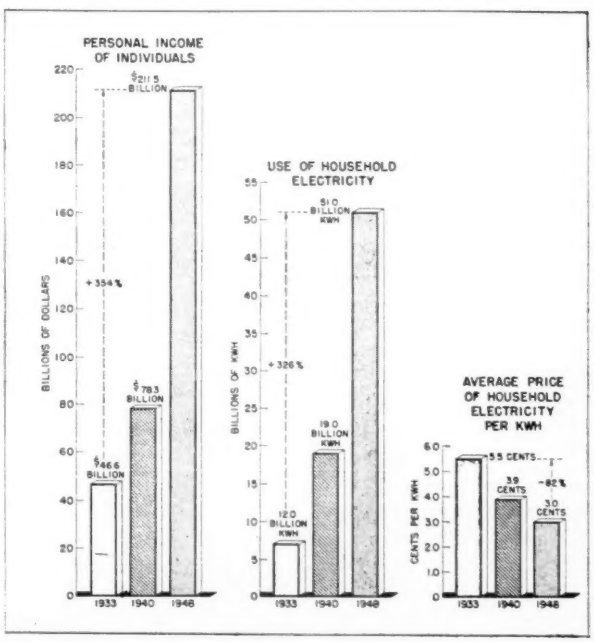

Fig. 9—U. S. Personal Income, Household Electricity Use and Average Price Per Kwhr of Household Electricity Compared for 1933, 1940 and 1948.

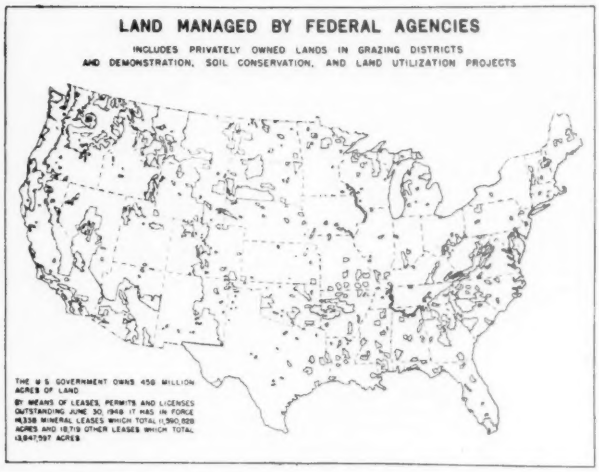
LAND MANAGED BY FEDERAL AGENCIES
INCLUDES PRIVATELY OWNED LANDS IN GRAZING DISTRICTS AND DEMONSTRATION, SOIL CONSERVATION, AND LAND UTILIZATION PROJECTS
THE U.S. GOVERNMENT OWNS 456 MILLION ACRES OF LAND
BY MEANS OF LEASES, PERMITS AND LICENSES OUTSTANDING JUNE 30, 1949 IT HAS IN FORCE 14,338 MINERAL LEASES WHICH TOTAL 11,390,920 ACRES AND 18,719 OTHER LEASES WHICH TOTAL 13,847,597 ACRES

Fig. 10—Lands Managed by Federal Agencies

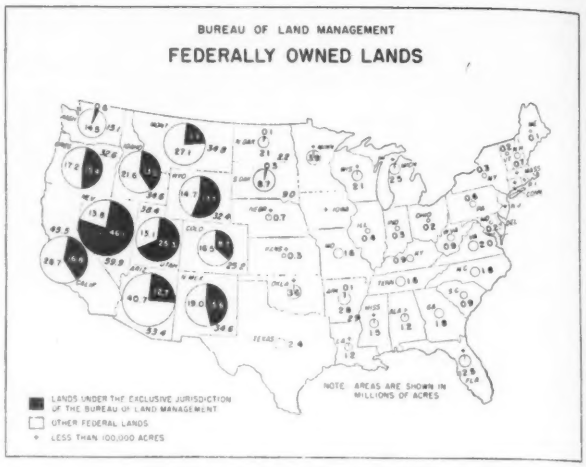
BUREAU OF LAND MANAGEMENT
FEDERALLY OWNED LANDS
LANDS UNDER THE EXCLUSIVE JURISDICTION OF THE BUREAU OF LAND MANAGEMENT
OTHER FEDERAL LANDS
+ LESS THAN 100,000 ACRES
NOTE: AREAS ARE SHOWN IN MILLIONS OF ACRES

Fig. 11—Federally Owned Lands

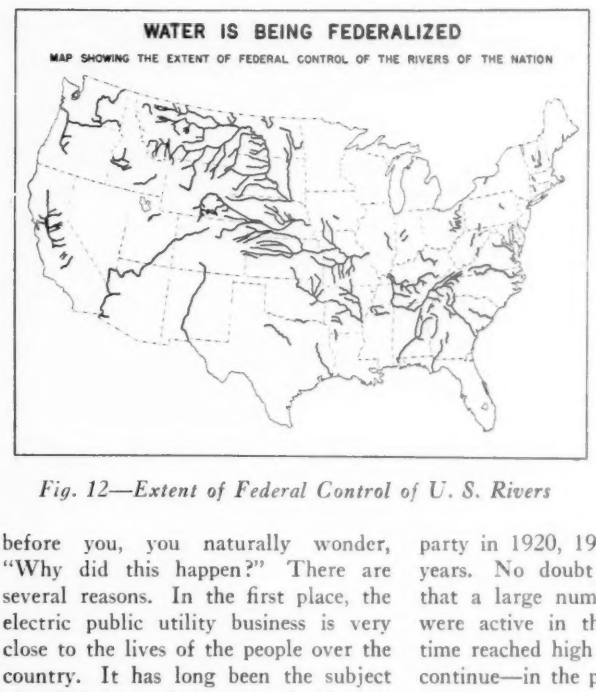

Fig. 12—Extent of Federal Control of U. S. Rivers

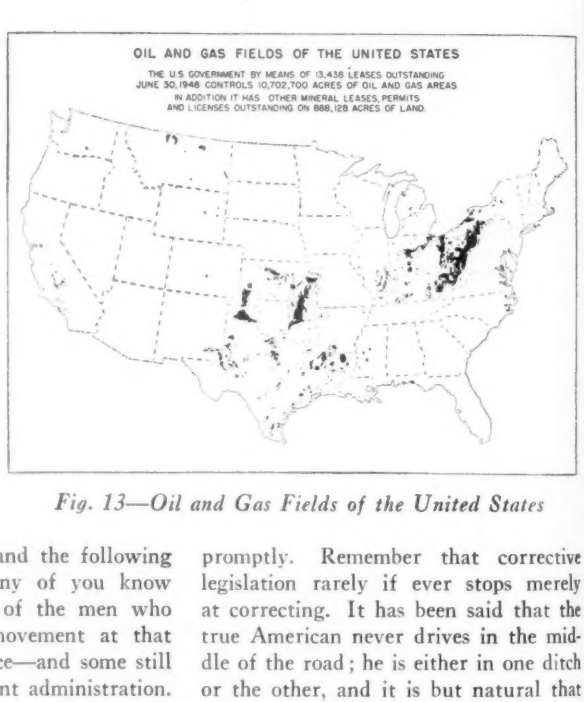
OIL AND GAS FIELDS OF THE UNITED STATES
THE U.S. GOVERNMENT BY MEANS OF 13,438 LEASES OUTSTANDING JUNE 30,1948 CONTROLS 10,702,700 ACRES OF OIL AND GAS AREAS
IN ADDITION IT HAS OTHER MINERAL LEASES, PERMITS AND LICENSES OUTSTANDING ON 888,128 ACRES OF LAND.

Fig. 13—Oil and Gas Fields of the United States

before you, you naturally wonder, "Why did this happen?" There are several reasons. In the first place, the electric public utility business is very close to the lives of the people over the country. It has long been the subject of political attack because of this fact and because it was easy to make an emotional appeal to great numbers of people without necessarily having any factual background.

It is of record that as early as 1920 the National Socialist party set out the nationalization of the electric light and power industry as one of the first objectives, and as a keystone of the socialization of the entire country. They soon added railroads, coal, oil, gas as the things they desired to socialize, and have kept steadily at it ever since.

Most of you know how closely the political situation of today approximates the platform of the National Socialist party in 1920, 1921 and the following years. No doubt many of you know that a large number of the men who were active in the movement at that time reached high place—and some still continue—in the present administration.

Abuses Within the Industry

In fairness, it should be said also that there were abuses in the financial programs of holding companies in the 1920's which should not have existed, and which when found should have been corrected promptly within the industry itself. The Federal Trade Commission's examination and disclosure of these conditions laid the predicate for both a factual and an emotional appeal that brought on the Securities Act and later the Public Utilities Act.

If anyone has in his financial structures or general operations such conditions, I recommend he correct them promptly. Remember that corrective legislation rarely if ever stops merely at correcting. It has been said that the true American never drives in the middle of the road; he is either in one ditch or the other, and it is but natural that the deserved corrective legislation in our case was harsh and went far beyond the requirements of the situation to become punitive and hurtful.

Let Facts Be Known Promptly and Frankly

In fighting political ownership of public utility enterprises, we have had the greatest success in those cases where we openly and frankly, and quickly, stated our position; brought to notice the facts that applied; and made our appeal in a manner to obtain the respect and confidence of the average citizen.

This doctrine in my opinion applies to the national legislative situation as well.

From my experience, I believe that the members of Congress often do not realize that some particular appropriation, a single act in extending bureaucratic authority, or an apparently unimportant policy, are in many cases another skillful and timely step by the planners in the nationalization of the industry and government of the United States.

A prompt, frank statement of the facts, a careful explanation of consequences, the accurate delineation of how each seemingly unimportant detail fits in with the broad plan of nationalization should be helpful to the members of Congress and to the country as a whole. If these men are fully informed and thereafter knowingly continue to assist in this nationalization, then indeed they should be replaced with others better disposed toward the protection of the rights of individuals and communities and smaller units of government and able and willing to protect them.

EEI, ECAP and Public Utility Information Program

In our industry we have long had a fine organization in the Edison Electric Institute. In respect of this problem, one of its principal functions is the supplying of facts about this industry to anyone who may request them. Along with it, are the technical, commercial and other activities that make up a good industry association. We have had public opinion surveys from time to time to check our course and progress. We have had, for several years, a national advertising program in which a substantial majority of the industry participates, which seeks to inform people that this is a great and nationwide industry, rendering a fine service at fair prices, and is entitled to be respected as such.

More latterly, a substantial group has participated in a public information program designed to make available to the operating company executives pertinent information, statements, plans and methods which aid in presenting this business fairly to its customers, investors, and the public. All of these things have little effect unless the men at the head of these businesses stand flat-footed and tell the public, their employees, investors, and their customers what the facts are and what their position is, and disclose the errors and unfairness and economic faults of nationalized, socialized business. When this is done, the response is good.

This is only the picture in our industry—the first objective of the planners. Oil, coal, atomic energy, water, are part of the same plan. With these nationalized, steel, transport—and rapidly all the others down to and including the corner grocery and farm—will follow; just as it happened in Russia and Poland and Germany; just as it is happening in England.

How Did It Start in Europe?

And how did it start in those countries? By the election of a demagogic leader who was willing to dissipate the wealth and mortgage the future of a nation and its people to accomplish his own rise to power and fame; who lulled the reason and consciences of a great people to sleep with promises of plenty for all at the expense of the few; who for a mess of pottage bought the birthright of freedom and hope and opportunity from a people and drove them to poverty, imprisonment, starvation and hopelessness.

Hitler was elected. Mussolini was elected; and millions of people trusted them and believed they could truly bring something for nothing. While they are dead, and most of their henchmen with them, it will take generations for the people they betrayed to heal the scars of conflict and regain the liberty they lost—if they ever do. Everyone who pays Federal taxes in our country today is contributing to the charitable purpose of enabling the victims of this process in those countries to exist until they can regain a reasonable ability to earn the necessities of life.

What Freedom Has Meant

The foundation of the development and progress of our country has been freedom: Freedom of worship, freedom of speech, freedom of the choice in work or profession, freedom to keep a fair share of earnings from labor and invest it in business either of one's own or started by others.

Under these freedoms men have labored with hope and pleasure and success in fields of their own choosing; have started their own businesses, have exploited their own inventions, have saved capital to invest in the automobile, steel, or other great industrial groups, or in the smaller enterprises of the nation; and above all, each generation as it labored and saved could plan on finer things and better opportunities for its children and its children's children.

Here is the heart and mainspring of America—here is the thing that keeps a man or a woman at the desk or plant or stove or shop or plow—those kids; a better home for them, school and college for them, a better job for them, opportunity for them, freedom, progress, pleasure—for them.

What To Do About It?

And what do you and I do about it? I tell my people that if they value the freedoms of America, say so; tell their friends what it means to lose those freedoms, openly oppose such a program. If the right to choose your job, to save money, to go in business, to own land, to strike, to be absent from work, to travel without political permission, to be tried by a jury of free men, to express your political beliefs freely, to worship as you please, to plan and save and labor in the knowledge that your children may have still greater opportunity is worth having and keeping, write your representatives in Government; tell them what mounting taxes, brought about by senseless government spending, are doing to you; and tell them you want to keep the freedoms of America they are helping to destroy.

May the God under Whom we have built this great nation and its industries and kept our freedom, guide and strengthen us to keep and protect them now.

Wisconsin Utilities Ass'n Hears Call for Crusade Against Socialism

(*Continued from page* 436)

T. Lawson, vice president in charge of sales, Nash Kelvinator Corp.; C. George Segeler, utilization engineer, American Gas Association; Ashton B. Collins, director, Reddy Kilowatt Service; J. W. Bryant, Syracuse, N. Y., and Harold H. Green, Cleveland, of the General Electric Co.; Robert Davisson, Pittsburgh Equitable Meter Co.; P. L. Covell, superintendent of production, and George B. Johnson, customer service manager, both from the Minneapolis Gas Co.; W. J. Ridout, Jr., New York, rural service manager, Edison Electric Institute; Walter K. Paul, industrial relations manager, Northern Indiana Public Service Co.; Carl Becker, Public Service Company of Northern Illinois, and W. L. Hayes, Minneapolis, general sales manager, Montana-Dakota Utilities Co.

A. C. Spurr, Head of Monongahela Power Co., Receives 1949 Gantt Award for "Management as a Community Service"

THE 1949 Henry Laurence Gantt Medal for "distinguished achievement in industrial management as a service to the community" was awarded Nov. 30 to Arthur Clinton Spurr, president of the Monongahela Power Co. of Fairmont, W. Va., at the 70th annual meeting of The American Society of Mechanical Engineers, in New York.

MR. SPURR

The award was made to Mr. Spurr "in recognition of leadership in welding the industrial, agricultural and human resources of his community into a cohesive and dynamic force that has revitalized and rehabilitated the social and economic life of the entire area to which his influence extends."

Established in 1929 in honor of the late Henry Laurence Gantt, management engineer and industrial leader, the award is made annually by a board composed of representatives of the ASME and the American Management Association. The presentation to Mr. Spurr was made at a luncheon of the management division of the ASME by Thomas Roy Jones, chairman of the Gantt Medal Board, and president of American Type Founders, Inc., Elizabeth, N. J.

Shortly after having become head of the Monongahela Power Co. 15 years ago, Mr. Spurr is credited with having initiated and to this day led a program of rehabilitation in the Upper Monongahela Valley in answer to a challenge which he considered was contained in a report of the United States Department of the Interior. The 1934 report, on the 10-county area of the valley, found 92 communities permanently or temporarily "stranded" and suggested that private interest "be invited to make this region a yardstick to measure the ability of private capital to benefit the communities within an area, socially as well as industrially."

Impressive economic gains in the area were recorded as a result of a corrective program initiated by Mr. Spurr. The benefits were achieved through such agencies as the Territorial Development Department of the Monongahela Power Co., created in 1936, coal bureaus, agricultural agencies and regional groups such as the Upper Monongahela Valley Association and the Little Kanawha Regional Council formed in the Central Ohio Valley region, also a part of Monongahela territory. Mr. Spurr is acknowledged as the guiding spirit of a majority of these groups.

In initiating his program, Mr. Spurr explained his purpose thus:

"To accomplish our objectives we must have the friendly cooperation of the public with whom we live. We must convince them of the honesty of our motives, and there can be no question of honest motives if we are working for the community and demonstrate a sincere desire to help the community grow and prosper.

"Ours is not a philanthropic or altruistic move nor a public relations stunt, but just plain good business. Perhaps it could be called 'enlightened selfishness.' We're frank about our policy, and our frankness hasn't hurt us. We admit we're in community development and territorial development to make money. We can't make money unless the people we are serving make money. No program should be undertaken unless its expense can be justified by the nature of the business in which the company is engaged.

"The company's stake in territorial development is the share it gets from increased prosperity for the people in its area. A heavy investment in plants and power lines makes it sound business for a power company to protect that investment by aiding the economic well-being of its customers."

J. E. Davidson

JAMES E. DAVIDSON, a former President of the National Electric Light Association and a Vice President of the Edison Electric Institute from 1935 through 1942, died of a heart attack on November 12, two days after his 70th birthday.

MR. DAVIDSON

Mr. Davidson was President of the Nebraska Power Company from 1928 until 1946, when the company went under public ownership as the Omaha Public Power District.

A leading citizen of Omaha where he was in the forefront of virtually every civic movement for more than 30 years, Mr. Davidson had a distinguished record of service with national electric utility organizations, particularly in the field of sales promotion. Perhaps his most characteristic attribute was the zeal and enthusiasm shown in his every undertaking—and the ability to spread his enthusiasm among his associates.

He was President of NELA in 1925-1926, launching at that time a major national drive for greater sales of electrical appliances. He continued the campaign the next year as chairman of NELA's Commercial Section. The organization's National Lighting Educational Committee, of which he was chairman in 1924 and 1925, sponsored the Better Home Lighting Contest in

(*Continued on page* 446)

The Selling of an Idea

By Harllee Branch

Vice President and General Manager, Georgia Power Company

An address before the General Sales Conference, Southeastern Electric Exchange, Atlanta, Ga., October 27, 1949

WE take great pride in the huge and costly generating plants which we are creating. We point them out as marvels of engineering skill. We take pride in being able to raise the capital to finance these plants. But I am telling you that there wouldn't be any new generating plants, there wouldn't be so much as one brick on top of another, except for the fact that we have customers ready and willing to buy the kilowatthours which these plants produce. Water wheels and steam turbines may create electricity, but they do not create electric industries. Customers make the industry—and selling produces the customers.

Public Service Function

I do not mean to suggest that any department of the industry is more important than another. All departments are essential and all must work together efficiently, as a team, if the industry is going to fulfill its function of public service. I do mean to say, however, that none is more important than the sales department. Those of you engaged in sales work are not only building the loads which make your companies prosper, but you are directly engaged in improving the economic climate and the standard of living of the areas in which you live and work. The electric industry was founded on salesmanship, just as American industry, generally, was founded on salesmanship. Salesmanship is the essential and distinguishing quality of what we call our system of free private enterprise.

Selling American Inventive Genius

The genius of the American people for devising new products, for inventing new devices, is well known. However, these devices would still be in the laboratory or workshop but for the ability of private industry to go out and sell them.

The electrical industry was not always the great essential public service which we know today. The invention of the electric bulb, which is the date usually referred to as the beginning of our industry, occurred just 70 years ago. Many people still living were born before that event took place. This remarkable development was not done by government; it was brought about by private initiative. No one suggested at that time that the job was one to be done by public agencies. There was no bureaucrat, standing at Mr. Edison's elbow, to assist or encourage him in his arduous endeavors. No professional humanitarian clamored for the appropriation of public funds to carry the job forward. The first central station plants and the first hydroelectric developments were similarly constructed without governmental assistance.

Georgia's "Conservation Association"

As a matter of fact, there was a group in Georgia, as in other states, who sought to prevent the development of our water powers by opposing our predecessor company and browbeating the Railroad Commission, the Governor and the Legislature. That group called itself a "conservation association." They even prevailed upon the State Legislature to direct a suit to be brought in the name of the State of Georgia, attacking the title of the company to the essential properties involved in its water power developments. This suit dragged its weary way through the courts, with all the prestige of the sovereign behind it. It was finally thrown out of court, and I mention it now merely to point that in those early days the so-called "conservationists" were not interested in the development of water power or electric power but in preventing it.

Our industry has been no petted child. Nobody has fed or fondled or favored it. It came into being, it developed and it grew, only because there were private citizens of daring and imagination who were willing to risk their fortunes and their futures on their ability to create a new industry, and their ability to sell a new and untried service. You and your predecessors and associates have done a wonderful job of selling electric service. You have overcome tremendous obstacles in the past, and I know you will not be discouraged by whatever obstacles may lie ahead.

Surplus Capacity to Sell

For the past four years, a great many of you must have had a feeling of futility because you had nothing to sell. The capacity of the industry has been severely taxed. There has been little surplus or idle generating capacity due to the fact that new facilities could not be constructed during the war years. The engineering and construction men have been hard pressed to measure up to the fine selling job which you did in earlier years, and you have had to mark time until they could catch up with you.

The time is now here when we will have to go out and sell our product and our service as in the prewar years. It is a fine thing for you and for the industry when we have surplus generating capacity for which we have to find a market. It is a bad thing for a company not to want business. Such an attitude may cause us to be indifferent to the needs of our customers. There is a temptation to run the business to suit our own convenience. In our industry, we cannot afford to neglect the interests of the people on whom we depend for our existence.

Selling An Idea

We must prove ourselves worthy and dependable servants of the public not only because we want to sell electric service but also because we have another selling job to do of even greater importance. It is the selling of an idea. It is the selling of private enterprise — the American way of life.

At Des Moines a couple of weeks ago one of the nation's leading editors asserted that electric utility management can and must take the lead in combatting the trend toward Statism in this coun-

try. He pointed out that we, who are employed in the privately-owned electric utilities, have the opportunity of showing the people of America that private ownership, under proper regulation, meets the public needs and does it better than government ownership. Our survival and the survival of American industry depends upon whether we can sell this idea.

I realize that the responsibility for meeting this challenge rests primarily upon the managements of our utility companies. However, I think you can do a better job of it than anybody else because the job is primarily one of salesmanship.

Private enterprise has come to the cross-roads. Perhaps some of you read Senator Taft's article in *Collier's* magazine recently. The theme of this article can be stated in a single sentence—namely, private enterprise cannot stand any more government. I don't believe that the average American realizes the extent to which we have sacrificed self-reliance for so-called "security." Unless the tide is checked, Socialism will replace private enterprise in this country.

Federal Taxes and Federal Lands

Already, 26 per cent of our national income goes to government in the form of taxation, and the history of other nations over the centuries demonstrates that when the national government of a country takes over 25 per cent or more of the people's total income in taxes, it virtually becomes their master instead of their servant. Some of you will be startled to learn that our government right now owns 24 per cent of all the land in this country. That is equal to the area of 17 western states. Remember, the government charges no taxes against itself. Each time the government enters another field it removes from the sources of taxable income some more potential taxes, putting a heavier burden upon the rest of the people. In other words, the bigger and more powerful the Federal Government becomes in the fields formerly handled privately by our citizens, the fewer people are left to carry the burden of financing our government.

The electric utilities have borne the brunt of evolving Socialism in this country for the past 16 years. We have seen the government take over more and more of our business until now 20 per cent is in public ownership. Even now scores of projects are under construction or on the drawing table or in pending bills before the Congress to enlarge this 20 per cent. We can meet this problem only on the ground where we are strong and the government is weak—namely, in the field of salesmanship. We must show the American public that we can serve it better and more cheaply than government. We must show that we want to serve the public and that we put service above profits. We must show the man-in-the-street that, in the long run, it is to his best interests to be served by private enterprise. In other words we must "sell" America again and again on the superior virtues of the system which has made our country the greatest nation in the world.

A Challenging Opportunity

Many persons are pessimistic about the future of our industry and about American business generally. I don't believe that we should lose hope. There are many hopeful signs on the horizons if we only have the faith and will take the time to look for them.

If you will pardon a personal word, I came to work in this industry just three months ago, after representing the Georgia Power Company as a lawyer for 18 years. I didn't come into this business because I thought it was going to be swallowed up by the government. On the contrary, I came into it because I thought it would survive its difficulties and increase year by year in usefulness to the people. I felt that my new job offered me a challenging opportunity to contribute toward that end.

Although we are often dismayed, perhaps frightened, by the government's policy to tax and tax, promise and promise, spend and spend, I believe we can derive comfort from comparing our present situation with what existed in the early 1930's.

Then business was silent—its leaders were either afraid or they did not know how to defend themselves. Now they are at least as articulate as their opponents. The attitude of the so-called influence group is changing. Then these people who molded public opinion—the newspaper editors, and writers, ministers, teachers, lawyers, and so on—were largely on the side of those who advocated expansion of the Federal Government. To a notable degree, this group is now becoming outspoken against the policy of high taxes and big government spending.

Where our industry once stood alone, we now have many friends who not only stand with us as a matter of principle but who recognize a common danger. Some of the public are still lagging behind the leaders, but they will catch up. Time is on our side.

Champions of a Just Cause

I would like to make a suggestion to you in concluding this talk. Ask yourself this question: "Apart from my special interest in this business and the fact that I get my living from it, do I honestly believe that private ownership of the electric business is the best thing for the American people?"

If your answer to that question is "yes," as I believe it will be, then I urge you to have faith in yourselves as the champions of a just cause.

I urge you to have faith that the right will triumph in the end, no matter how doubtful the road may seem ahead.

Having once convinced ourselves of the rightness of our position I think we will find that selling it to others will be a much easier task.

J. E. Davidson

(*Continued from page* 444)

which 4817 cities and towns in the United States and Canada were organized. He also was first chairman of NELA's Public Relations Committee in 1920 and chairman of its Wiring Policies Committee in 1928.

Mr. Davidson served two terms as president of the Association of Edison Illuminating Companies, in 1937 and 1938, and was a member of its Executive Committee from 1940 through 1945. He also was a vice president and later a trustee of Edison Electric Institute and national chairman and a member of the Executive and Public Policy Committees and of the Advisory Council of the Electric Refrigeration Bureau.

Mr. Davidson began his utility career with Port Huron (Mich.) Power & Light Co. at the age of 20. He headed Consolidated Light & Power Co., Montpelier, Vt., and Pacific Light & Power Co., Portland, Ore., before going to Omaha in 1917 as vice president and general manager of Omaha Electric Light & Power Co., later Nebraska Power Co. He became Nebraska Power President in 1928.

The Challenge in Industrial Power Sales

By Robert G. Ely

Assistant Manager Power Sales, Public Service Electric & Gas Co., Newark, N. J.

An address before the General Sales Conference, Southeastern Electric Exchange, Atlanta, Georgia, October 27, 1949

THE Challenge in Industrial Power Sales can not be told without the qualifying thought that differences in industrial power sales organizations, their problems, and their methods, are nearly in direct proportion to the number of companies considered. For this reason, my analysis of the outstanding challenge in power sales, together with the possible courses we might follow to do a better industrial sales job, may not have industry-wide application.

War greatly accelerated electrification of industry and brought immediate customer acceptance of many new power applications and new production methods our power salesmen had been urging for years. Surprisingly, perhaps, these new production methods stayed sold after the war, with the net result that power sales growth crowded into the last eight years has been tremendous.

Industrial Sales Future

As utility power plant completions spread through the industry and industrial activity loses some of its momentum, reserve generating capacity is starting to climb. After the first phase of improved operating ratios partially attributable to new and efficient plant has passed, pressures will be exerted for increased industrial sales to load our systems.

This same slackening in industrial activity has brought many problems to our industrial customers. In some instances they are struggling for survival. Where two or three competitors existed in a business before the war, there may now be 20 or 30. Where sales for the last seven or eight years taxed productive capacity, many now find it difficult to maintain a five-day week with a single shift.

Reduction in manufacturing costs is essential if these customers are going to stay in business and support other residential and commercial business in our territories. This struggle for survival has been experienced many times before, but seldom after so long a period of easy money. Many companies in their desire to cash in on the large markets of recent years have failed to take time out to engineer plants for the lowest possible production costs. In many cases, low depreciation rates allowed for tax purposes have discouraged the retirement of obsolete machinery in favor of modern equipment. These customers need our help.

Industrial Customers' Problems

Indication of this fact in our territory has been quite conclusive. Over 3000 of our 6000 industrial customers have seen our publication "Your Business and Ours," offering the assistance of our sales specialists. Six hundred and seventy-five have asked for assistance on 830 different problems.

We have, therefore, two problems: first, assistance to our customers in lowering production costs and breakeven points so that they will be able to maintain profit margins, maintain employment and continue to support our residential and commercial sales with their payrolls. Secondly, we have a growing need for increased industrial sales and revenue to offset increased investment in utility plant.

Two Problems, One Answer

The answer to these two problems is not simple. If we do a good methods or industrial engineering job in helping our smaller and medium-sized customers lower their production costs, it will be very time consuming and the volume of new business may appear quite small. On the other hand, if we push ahead with some new plan for marketing "off-the-shelf" applications without regard to the real problems many of our customers are facing today, we may lose as much load through business failures as we gain through the sale of new equipment.

Is it possible to do both? I think it is, and I think this is the challenge in industrial power sales today.

Prewar power sales methods were admittedly sound, but involved many personal contacts and much personal research with slow customer acceptance. During the war, Job Methods Training Courses were run throughout our customers' plants with the object of developing better and quicker methods of producing war material. The utility industry was smart enough to see that training of this type was one answer to improving the effectiveness of power sales organizations and speeding customer acceptance of new power applications.

The Industrial Power and Heating Section of the Edison Electric Institute brought out a section of the Power Sales Manual devoted to Production Method Analysis for Power Salesmen and a complementary section on Materials Handling.

Value of Methods Engineering

The purpose of these sections was to equip power salesmen in the knowledge of the fundamental principles of methods engineering as a sound approach to increased power sales, with materials handling knowledge serving as a "door-opener" to a phase of our customers' business where sound operating economies are often easily found.

We have had several years to build our power sales organizations to proper strength and we should not fail to train them in this work. We have tried to follow this course in our Company for some time and a recent incident is an indication of some progress.

I asked one of our men what he thought the challenge in power sales today was and he replied with the fact that he had recently asked a customer in the fur dyeing business what was new in his business. The answer came back that there had been nothing new in the last 25 or 30 years. This was a casual meeting and I am sure an appointment will be made to go through that plant with care, and I am as interested to see it as our power salesman. He felt there must be something we can do in that customer's plant to improve the process,

eliminate "bottlenecks" and increase the rate of production, lower unit costs or find some new way of turning rabbit skins into mink.

It was inconceivable to him that there were no new or improved motor applications, no new materials handling methods, no new uses of electric heat, no chance to improve product quality with better plant lighting. This was an industry that must have been overlooked and it was an opportunity to do a job.

Selling Low Cost Methods

We aren't faced here nor in the rest of our sales organization with a reluctance to get deeply into production, processing and business problems, but on the contrary we have a keen interest in bringing to all of our industrial customers the newest and the best methods of producing goods at low cost. Certainly there are many jobs we encounter that are too big for us to handle, but we try to get the customer's acceptance of industrial engineering consultants when we get in too deep water.

Does work along these lines interest customers? Recent magazine articles and a meeting notice include:

Over 140 pages in the last six issues of *Factory Management and Maintenance* devoted to a series of articles entitled "Bear Down Now on Production Costs."

An article on "How to Reduce Factory Costs" in the August 1949 issue of the *Conference Board Business Record.*

A meeting in November of the Society for Advancement of Management directed toward "Active Cooperation in Building Productivity and Cutting Costs."

Surely, we capture our customers' interest when we work with them on improved production methods.

Off-the-Shelf Application Sales

Accepting this approach to industrial power sales as sound and not too greatly different than the pre-war approach, how can we accelerate load additions for increased revenues? I think we can find the answer in stepped-up promotional activities with periodic concentrations on the sale of "off-the-shelf" applications of proven economic soundness.

Perhaps the first step in more active promotion of industrial power sales is the preparation of a complete and continuing market analysis. This sounds like a very formal procedure and a time-consuming operation, but in reality it comes along as a natural outgrowth of the industrial engineering job on which our power salesmen are working every day.

Market Analysis Tabulations

The answer is, of course, that instead of carrying detailed information on plants and processes in their heads, the information is tabulated in some brief form that discusses the basic processes in the plant, the special equipment already installed and the equipment or new power applications for which the customer is deemed a prospect at the time. This record should also show brief reports on the calls made and new load sold to the customer.

With a record such as this on each industrial customer, large and small, it becomes a relatively simple matter to survey the entire territory to determine the possible market for a new piece of equipment, air conditioning, improved lighting and the other load builders we have to sell. In addition to determining the size of the markets we have to sell, a market survey of this type tied in with a study of industrial development possibilities of the territory provides valuable information for load forecasting and distribution and generation system planning.

In view of the subsidized competition we have on all fronts these days, adequate planning of facilities takes on even more importance than in the past.

Increase Customer Contacts

The next step seems to me to be an increase in number of customer contacts. It is not necessary that the salesman be present at all of these contacts, but that by some device or other the company's name and his name should appear regularly on the customer's desk. Necessarily, with deepened interest in the business problems of each customer, the salesman is going to have less time to make friendly calls merely inquiring as to the state of business.

All of us are using this type of contact to some extent with the mailing of house organs, "Electrified Industry" and other information deemed of interest to our customers.

We are trying an experiment this year in the initiation of an Industrial News Letter which will be sent to our customers six times a year on a personal basis by our power salesmen. This letter will be uniform for all customers, except that it will be mailed under the personal signature of the man handling the account. The procedure is based on the personal approach and keeping the names of our men constantly before our customers. We are greatly in hopes that this method will assure readership of these letters and keep them out of the circular file until they have served their purpose. It is a direct mail campaign we think will speed our contacts and at the same time give our men more time to study each customer's problems.

Group Selling

The next step, as we see it, is to endeavor to sell our customers in groups —one or more application at a time to a lot of customers. The Westinghouse Electric Corporation with its "Productive Power Show" and the General Electric Company with its "More Power to America Program" have given us the lead in this respect. These programs are based on the simple hypothesis that you can help 300 customers over the first two steps to a sale—the need, and the solution—at one time and save many calls in the field.

Properly scheduled meetings with interesting and up-to-date programs in which power salesmen, equipment manufacturers and distributors partake is good sound sales promotion. Sales will be created at lower unit costs than the "door-to-door" or "plant-to-plant" method of hunting suspects and developing prospects.

When group meetings are held to bring new developments to our customers' attention, interest is definitely established and we will surely fail in our promotion job if we do not follow up with our customers. What should actually develop then is a periodic concentration on the sale of specific uses of power in industry. Concentrated promotions on industrial lighting, air conditioning, electric heating, welding, materials handling, then become an essential part of the sales program.

Periodic Concentration

The value of such concentration in increasing sales is obvious for several reasons. The field of power sales is so broad that it is impossible for our salesmen to keep constantly aware of all of the terminology and engineering factors incident to all the power applications they have to sell. Periodic concentration permits them to familiarize them-

selves with latest developments and prepare a sounder sales presentation. This concentration is timed at the season when customer acceptance is most probable, and in the lighting and air conditioning fields this has a definite bearing on the success of a campaign.

Sales Policies & Methods Subcommittee

In the beginning, I pointed out that industrial power sales policies varied greatly between companies. In many, the periodic concentration on specific power applications may not be feasible. In others, some variation of a program such as this may be desirable. The Industrial Power and Heating Section of the EEI recognized this fact at its meeting in Bedford Springs last June and at a meeting in New York this September, a Sales Policies and Methods Subcommittee of the General Power and Heating Committee was established, with Frank Wiatt of The Cincinnati Gas and Electric Company as Chairman.

This committee is to collect, correlate and distribute among member companies data pertaining to sales policies and methods in the industrial power field. Specifically, they will analyze how various utility power sales departments are set up for sales promotion. They will study sales promotion programs and their effectiveness, and they will examine and report on the methods used to establish cooperation between our industry's sales organizations and those of equipment manufacturers, distributors and dealers.

Selling Electric Service

We should keep in mind that all we have to sell is service—electric service. In our conviction that there is only one best way to do a job—electrically, of course—we may lose sight of the fact that the use of electricity for certain processes in industrial plants may have to be sold in competition with other methods of doing the same job. Coordination of advertising programs of apparatus manufacturers and distributors with our own, and the concentration of all on the basic theme—that the best way is electrically, of course—will help us all to do a more effective sales job. This committee will confer with apparatus manufacturers in an effort to determine the possibility of closer coordination of manufacturer and utility sales promotion programs.

The activities of this committee should be valuable to us all in planning our sales work.

Another factor in speeding industrial power sales is prompt nation-wide dissemination of information on developments in the application of power and information of use in meeting competition. Committees studying these phases of our activity are a part of the Industrial Power and Heating Section of EEI and I understand that similar committees exist in the Southeastern Electric Exchange. I know that close cooperation exists between these groups, and men like Paul Lyman, Mason Guillory, Ben Askew and W. P. McCutcheon are members of both groups. The value to the industry of the work of these committees cannot be overstated, for the entire industry is quickly aware of new developments by which our customers may profit.

Free Exchange of Information

During the war, I was talking with Mr. David Sciaky, President of the Sciaky Welder Company, about American Industry and, newly arrived from France, he said that he felt that much of American Industry's greatness was attributable to the free exchange of information through conventions and trade association meetings and reports.

Utility power salesmen deserve a large share of credit for the mechanization and electrification of industry in this country today. Their contribution in the future can be even greater if we plan our industrial sales program with care.

Let us continue to train our men in the principles of methods engineering so that their recommendations to customers will be sound from an economic standpoint and of real value in lowering production costs and maintaining profit margins.

Let us maintain sales organizations of sufficient size to do this work properly and at the same time augment the activities of these men with programs designed to make frequent personal contact with their customers for them at regular intervals.

Value of Selling to Groups

Let us investigate thoroughly the value of selling groups of customers at one time, the new applications of electric power which can be used in their plants.

Let us explore the value of periodic concentration of sales efforts on specific electric power applications in coordination with the sales promotion programs of apparatus manufacturers.

Let us continue the interchange of information through committee work and association meetings toward the end that we can do a more effective sales job.

Intensify Sales Activity

We in the industrial power sales field have a challenge. It is not competition from within—from our customers—because we have been successful over the years in selling purchased power as essential to industrial plant operation. It is not competition from without—subsidized competition—for in most cases such competition is a problem of top management. It is, rather, the intensification of sales activity which will bring the low cost production to our customers' plants that comes with complete electrification. Recognition of the services we render to industry will come and we will develop staunch allies in meeting our competition from without.

The Electric Industry In 1949

(*Continued from page* 435)

economics and democratic government that taxes collected from the self-supporting electric companies be used to help support competing government-owned electric systems which are largely tax exempt and which, in addition, are subsidized out of taxes collected from the companies' customers.

Despite this socialistic movement against the electric light and power companies, they have a tremendous weight of evidence that they enjoy to an even greater degree than ever the confidence of their customers, their employees, their investors, and the general public.

With full appreciation of such confidence, these business-managed companies will continue to provide our nation with the best and cheapest electric service in the world.

Industrial Relations Conference Program Highlights

By S. F. Leahy

Chairman, EEI Industrial Relations Committee

TIMELY discussion of welfare benefits, pensions and amendments to the Fair Labor Standards Act highlights a broad, topical program of the Industrial Relations Conference to be held at the Roosevelt Hotel, New Orleans, La., Jan. 19-20, 1950, sponsored by the EEI Industrial Relations Committee, the Southwest Personnel Committee and the Southeastern Electric Exchange. An expected large attendance will also hear featured addresses by W. O. Turner, president, Louisiana Power & Light Co.; A. B. Paterson, president, New Orleans Public Service, Inc.; R. S. Nelson, president, Gulf States Utilities Co., and Frank M. Wilkes, president, Southwestern Gas & Electric Co.

Pensions and Welfare Benefits

Legal aspects of the "Demands for Increased Welfare Benefits" will be reviewed by F. A. Costangy, attorney, Atlanta, Ga., giving particular attention to (a) when a company must bargain, and (b) when a company may deny. A follow-up in the form of a panel discussion will present electric company executives thinking on "Pension and Social Benefits" with vice presidents F. R. Rauch, Cincinnati Gas & Electric Co.; J. S. Gracy, Florida Power Corp.; F. L. Larkin, Wisconsin Electric and Power Co., and V. C. Brennan, Union Electric Co. of Missouri, making up the panel.

The Hon. W. R. McComb, administrator, Wage & Hour Division, and Public Contract Divisions, U. S. Department of Labor, will speak on the second day of the meeting giving his views in a "Discussion of Amendments to the Fair Labor Standards Act," interpreting the definitions of exemptions for payment of overtime to executive, administrative, technical, outside sales and retail sales personnel.

"Is Arbitration a One-Way Street?" a talk by Aaron Horovitz, arbitrator, New York City, will lead off the second session of the conference on the afternoon of Jan. 19.

Completing the well-rounded program on the first day of the conference, addresses before the delegates will be delivered by W. O. Turner, president, Louisiana Power & Light Co.; A. B. Paterson, president, New Orleans Public Service Inc., and O. Van Rye, personnel administration counsel, New England Power Service Co., who will speak on the "Importance of Employee Attitude in Public Relations."

Featured at the concluding day's sessions will be speeches by H. R. Pearson, Dallas Power & Light Co., who will talk on "Supervisory Development"; Hon. W. R. McComb; G. B. Arthur, Jr., president, Management Evaluation Services, Inc., Toccoa, Ga., who will explain "Employee Opinion and Attitude Surveys"; Roy S. Nelson, president, Gulf States Utilities Co.; and Frank M. Wilkes, president, Southwestern Gas & Electric Co., who will furnish a preview of "What We May Expect."

A round-table discussion at the close of the conference will deal with "Significant Union Demands in Utility Negotiations," with reference to (a) past year's experience, and (b) future demands.

The three sessions on each day of the conference will be presided over in succession by T. A. Busby, vice president, South Carolina Power Co., and chairman, Personnel Administration Section, SEE; Jay Alan Reid, personnel director, Southwestern Gas & Electric Co., chairman of the Southwest Personnel Committee, and S. F. Leahy, personnel director, The Detroit Edison Co., and chairman of the Industrial Relations Committee, EEI.

A registration fee of $12.50 will be made for luncheons and other expenses incidental to the meeting. Delegates applying for hotel reservations should write to Mr. W. H. Senyard, director of personnel, Louisiana Power & Light Co., New Orleans, La.

Utah Power & Light Helps Sponsor Unique Electric Kitchen Promotion Campaign

A UNIQUE job of electric kitchen promotion was recently undertaken by the Utah Power & Light Co. in cooperation with the Intermountain Electrical Association, the Salt Lake City *Tribune* and *Telegraph* and the Utah Home Builders Association. The promotional activity covered the two weeks from September 11 to September 25 and featured a "Treasure Hunt" and jingle contest with $6,000 worth of prizes. The first prize consisted of a $1,500 all-electric kitchen and a Jack Pot of building materials sufficient to build a full house around the electric kitchen. Prizes for runners-up included a television set, refrigerator, electric stove, hot water heater, electric blankets and a home freezer.

The program was given wide publicity through stories in the *Tribune* and the *Telegraph*, and advertisements in other local papers, spot announcements on 17 local radio stations and billboard and car card advertisements. In addition, Utah Power & Light sponsored a weekly half-hour television show, "Better Living Electrically," on which the all-electric kitchen was featured.

The Utah Home Builders Association, besides providing the Jack Pot of building materials, put 46 model homes on display for use in connection with the jingle contest. Contestants were required to finish the last line of a jingle on the basis of clues to be found in a number of model homes. Many of the homes featured all-electric kitchen displays where more than 4200 copies of the EEI Commercial Department's booklet "Kitchenizer's Digest" were distributed to visitors.

In addition, "The Constant Bride," a technicolor electric kitchen promotional movie sponsored by EEI's Commercial Department, was shown several times daily at the Tribune-Telegraph Audi-

(*Continued on page* 464)

Seminars Broaden Understanding Between Colleges and Industry

By F. E. Verdin

Director of Personnel, The Cleveland Electric Illuminating Company

An address before the Industrial Relations Committee Meeting, EEI, New York, N. Y., Sept. 29, 1949

MORE than two years ago, our company conducted a survey to determine how college students felt about working in the electric power business. At the same time, we conducted another survey among operating companies to get a composite picture of conditions of employment which presumably were influencing the students' attitudes.

Our findings surprised us!

Five Student Impressions

We found from the surveys that the industry which meant so much to us was not even being considered as a career by many of the most promising college men. Far too many students had five principal unfavorable impressions of our business:

1. Electric utility company salaries were too low.
2. Electric companies did not interview and recruit men on college campuses.
3. Electric companies seldom offered good training programs.
4. Opportunities for advancement were too limited in the business.
5. The industry offered too many of the disadvantages of Civil Service.

In the course of our survey, one engineering school dean pointed out that although we were then being snubbed by the vast majority of engineering graduates, our industry had once been a favored one. This observation was especially ironic because formerly our business held out far fewer opportunities than it does today.

In fact, as we all know, our business is one of the fastest-growing in the nation. It has unlimited potential for expanding its service and increasing its value—provided the invasion of its field by the federal government can be stopped.

Already, former studies of this growth seem too modest. It was expected, for instance, that the business would be four or five times its present size within 30 years, and that the total current valuation in the property and plant account of something less than 20 billion dollars would rise to more than 80 billion dollars within the next generation. It now seems likely that this future figure may be considerably larger.

This expansion naturally will call for men with ability and training who can direct and administer vastly larger operations. And it will call for many more such employees.

The problem of enlarging staffs all the way up to the top executive level is intensified by the fact that the average age of electric utility executives is high.

Surveys have shown, for instance, that the average age of top utility executives is close to 60, with 85 per cent of them being 50 or older. Therefore, the retirement rate will be rapid over the next 15 years.

In addition to the obvious problem of executive replacement which thus faces the utility business, there is another impelling reason why electric companies must take a long, hard look at their plans for obtaining a future supply of high-grade manpower.

Greater Skill & Ingenuity Needed

The business has become much more complex over recent years. Costs have risen spectacularly and have changed some of the economic trends in the industry. Because of this cost factor, there is a need for maximum skill and ingenuity in design, construction and operation of electric properties, in public relations, in selling and in living with government regulation. To carry on work in connection with these needs requires high quality of employees at all levels.

All these factors add up to a rather serious situation. But happily, many individual companies and the industry as a whole have reacted constructively to the unflattering attitude revealed among undergraduates two years ago.

A larger number of companies now are pushing recruitment programs among college men. New publicity material, seeking to acquaint undergraduates with the very real advantages of the electric business as a career, has been prepared and distributed.

Last year, an EEI subcommittee headed by H. K. Breckenridge, vice president of West Penn Power Company, concluded a thorough study of the problem and came out with a suggestion for improving the industry's approach to college men. Among other things, the subcommittee recommended distribution of factual printed material to prospective employees at colleges. This material, setting down in black and white the attractions of the industry, should be an important supplement to personal recruiting visits to colleges, the subcommittee said.

Within many companies, starting rates of pay for young engineers have been reviewed and, in many cases, revised upward. Training programs have been initiated in some companies and improved in others.

Our company recently took on one further step which we hope will result in a higher regard among college men for the Illuminating Company and the electric business.

We felt that improved relationships with college faculty members would be constructive in improving students' attitudes. Our thinking along this line was stimulated by discussions with faculty and administrative representatives of Case Institute of Technology and Western Reserve University. Both of these institutions are in Cleveland and our executives have frequent contact with their faculty members.

Plans For Faculty Seminar

Accordingly, we developed plans for a three-day seminar for faculty members of engineering colleges. Our aim was to provide the visiting professors with broad information on operations of our company and to show them directly the opportunities presented outstanding engineering graduates by the company's continuing growth.

Since the meeting was planned to be, as far as we knew, the most comprehensive one of its kind ever held by an

American light and power company, we felt we were living up to the literal definition of a seminar—"an advanced course of study."

Seven engineering schools in our general area were invited to send six representatives each to the meeting. We wound up with 37 participants, ranging on the educational level from new instructors to deans. Each of the schools invited was represented, and two of them sent men from their business administration departments. The schools were Carnegie Institute of Technology, Case Institute of Technology, Fenn College, Ohio State University, Purdue University, University of Michigan and University of Pittsburgh.

Talkfests and Tours

The discussion meetings were held at the Cleveland Hotel. We broke up the talkfests by taking the visiting professors on tours of our properties. Several luncheon and dinner meetings were also held.

Throughout the seminar, we tried to keep the proceedings on a give-and-take basis whenever possible. We were anxious to convey useful information about our company, but we were also eager to learn something of the professors' problems and their attitudes toward our business.

The luncheon and dinner meetings were particularly suitable times for our guests to talk informally with our executives about questions that kept occurring to them. Our entire Executive Staff—the top 14 administrators in the company—was on hand much of the time.

The talks given by our people at the seminar aimed at furthering two broad objectives.

"Plus" Values

First, we wished simply to explain how our company is set up, how it operates, and what its principal problems are. An essential thread of thought running through all our discussions was our continually expanding need for first-class manpower and the opportunities we offer such manpower through our potential for virtually unlimited growth. At the same time we sought to show how these opportunities also constitute challenges.

Our second objective was to explain many of the "plus" values of a typical company in our industry which may not be realized fully by those outside our industry. Among the extra values we tried to bring out were these:

1. Our company is public-spirited and is a community-builder.
2. Our operations are efficient and economical.
3. We are sales-minded and are always trying to broaden the useful scope of electric power.
4. We are soundly financed and, over the years, have had a good record of earnings.

In this connection, we emphasized our recognition of the fact that it is not enough for our business to supply customers with modern electric service, to pay the employees well, to provide them with good working conditions, security and opportunity to advance, and to serve the public as a good neighbor and constructive element in the community. We also stressed the responsibility of our business to earn an adequate return for its investors—a return which will be sufficient to attract more capital. This capital, in turn, will enable us to provide more service as our customers require it.

5. Our personnel practices are modern and progressive.

"We Believe In . . ."

To bring out this last point, this excerpt from our Employee Guide was cited:

"We believe in keeping the Company a first-class place to work, paying fair and just wages and salaries; providing the employees with such benefits as vacations with pay, sick leave with pay, paid holidays, pensions, and life insurance; and continually endeavoring to maintain good working conditions.

"We believe in the Company doing all it can to assure employees of security, opportunity and recognition of work well done.

"We believe in the Company and in every employee helping to develop the fullest and finest teamwork."

The prepared talks by our top-level executives covered all the phases of our business which logically could be expected to be of interest to professors teaching engineering students. The following titles indicate the subjects discussed:

Broad Problems of the Industry
Investors in Our Business
Problems of Power Plant Engineering and Design
Problems of Customers' Service
Employee Development
Problems of Electrical Engineering and Operation
Accounting in a Utility
Rates and Regulation
Transmission and Distribution Systems
Sales Promotion

We were gratified by the interest shown in the program by the visiting faculty members. Actually, their enthusiasm was greater than we had anticipated.

Visitors Express Appreciation

Unanimously, they expressed belief that the information presented at the seminar held a high degree of value for them. They said they had obtained a much clearer picture of the electric light and power business, and naturally of our company in particular, and that they would be materially assisted in their teaching work.

The professors seemed especially interested in the opportunities offered them to see power plant equipment at a stage of construction where it was fairly complete but still not enclosed. They were thus able to inspect the equipment much more thoroughly than is ordinarily the case.

At our Avon power plant, for instance, two new generators were being installed. Both were due to go on the line within a few months after the seminar. The professors also inspected one of our largest substations and visited a warehouse where a variety of work goes on.

Seminar a Success

After the completion of any project which is somewhat experimental, such as our seminar, it is natural to wonder whether the endeavor was worth the effort. We firmly believe our seminar was a success.

We have not yet decided whether further seminars of this nature will be conducted, but we are actively considering such questions as:

1. Should such seminars be conducted regularly?
2. Should similar seminars be provided for others having to do with some phase of vocational guidance or business economics, such as:
   a. Arts college faculty members?
   b. High school teachers?
   c. Other groups?

The decisions we eventually reach on

(*Continued on page* 461)

Selection and Training of Purchasing Personnel

By C. F. Ogden

Purchasing Agent, The Detroit Edison Company, and Chairman, Purchasing Subcommittee, Purchasing & Stores Committee, EEI

From a paper presented before the EEI Purchasing and Stores Committee Meeting, St. Louis, Mo., May 9, 1949

HOW wisely purchasing agents spend their companies' money depends in large part on how well they select and train personnel.

Obviously, no purchasing agent can single-handedly buy the millions of dollars worth of fuel, equipment, materials, supplies, and services which our companies use. Nor can we single-handedly assure that our companies will get delivery of the materials and equipment when they're required.

Each of us needs competent personnel to assist us—and the larger the company the more pressing is this need. As you all know, a well qualified purchasing staff can be very effective in producing savings—and these savings are significant in terms of profit and loss.

Present Practices

Since it is highly desirable to have adequately trained personnel, what are the current practices being followed by electric companies for this selection and training?

Our recent survey of the industry indicates that:

1. In selecting buyers, none of the large companies are using tests while only 30 per cent of the other companies are using them, and
2. As for a training program for buyers, 70 per cent of all the reporting companies have none.

Neglected Art of Purchasing

While those are cold figures, I am sure that the figures do not truly reflect our actual practices. However, they do indicate what I consider to be a lack of understanding and a lack of appreciation regarding a basic problem. In making this statement, I am very mindful that in our own Purchasing organization, in Detroit, we too have much more to do in the field of training.

Based on the survey, no one has what might be considered as a complete and formally organized program for the selection and training of Purchasing personnel. Several indicated that they are doing regular training, but their programs are definitely limited in scope. Some indicated that they had been thinking about this subject for years but had done nothing formal as yet. Many were most helpful in sending along their thoughts on what a training program should be.

I know that many companies actually are doing a training job. However, many times this training is limited to training for a specific job. Occasionally, it is expanded to cover orientation on the overall procedures of the Purchasing Department or the Company as a whole. However, very little planned consideration or effort is devoted to giving an overall background and training in what might be called the art of purchasing.

It appears that most of us have been more concerned with getting people to perform in a more or less routine manner on a specific job rather than (1) equipping them to do an excellent job on their present assignments, and (2) preparing them to handle better jobs.

> The management of our public utilities has for some time recognized that the proper control of the ever increasing investment in materials and supplies has become one of the essential functions to effect smooth and efficient operation of a company charged with the responsibility of providing the public with uninterrupted service.
>
> To effect such a control, the Stores Department must provide the required quantity and quality of material at the required time and place and with the minimum feasible investment. The successful discharge of these responsibilities is possible only with an organization consisting of capable and experienced personnel. This, in turn, has created a demand for the careful selection and training of the personnel. It was with this thought in mind that the Purchasing Subcommittee chose for study and development the subject Selection and Training of Purchasing Personnel.

A Critical Problem

The selection and training of buyers is one of the most critical problems which we face today. All of us are vitally concerned with our personnel and particularly with buyers. We must rely upon them to get the job done. How well the job is done will depend in large measure on how well we have prepared them to carry on.

Selecting Buyers

Let's consider for a moment the problem of selecting the proper type of person for a utility buyer's job. What type of a man are we looking for? What qualifications do we want him to have?

First, let's consider the nature of the material we are buying. As you know, the bulk of it is engineering in nature. Also, our buyers have to deal with engineers, both in our own companies and with sales engineers and the other technicians of our suppliers.

Because of this, we in Detroit Edison, feel that we should have engineers in the technical buying jobs, such as electrical, construction, and mechanical buyers. These engineers may be graduates of technical schools or have had the equivalent in practical experience. It is more practical, we think, (and will take less time) to take a technical specialist who has the proper qualifications and train him to be a good buyer rather than to take an individual who has excellent general qualifications and give him the knowledge and training of a technical specialist.

On the other hand, for our non-technical buyers jobs, such as stationery, appliance, and food buyers, we do not have a technical requirement. Rather, we take personnel who have the proper general qualifications and train them to be non-technical buyers.

There is one other basic consideration in selecting personnel. Whenever

possible, we want to select men who have good potentialities for growth—who can eventually become Senior buyers or even the Department Head.

Qualifications for Buyers

For all of our buyers we, of course, want them to have brains—but brains are only part of the story. An excellent engineer would not necessarily make a good electrical buyer. However, if an engineer indicates a desire to do so-called non-technical engineering work, then we have the makings of a likely prospect. Our Employment Department finds that about one engineer in ten feels this way.

When the applicant is interviewed in the Purchasing Department, we know he has had the proper technical background and are interested in finding out what he has done in other fields. We depend a great deal on this interview. We want to know whether he has (1) spent much time in extra-curricular activities, (2) shown any indications of initiative and interest, (3) been able to do satisfactory work when he was following several projects simultaneously, and (4) whether he has an inquisitive nature, i. e., does he want to know why a thing is being done in a given way and whether or not there is some better way to do it.

We like to get a good balance in all of these characteristics. Perhaps no one characteristic is of first importance—for a well rounded man is much better than one who is particularly outstanding in only one characteristic and not so hot in the others.

The Training Program

Based on the information developed in the survey, I believe that considerable benefit would result from a more active consideration of a complete and formally organized Training Program.

Scope of the Training Program

A realistic Training Program for buyers should cover more than (1) an introduction to the Company and what each department does, (2) an explanation of your departmental procedures, and (3) the mechanics of doing a specific job. We should also give the buyer trainee adequate information and instruction in the Art of Purchasing. In other words, a well planned program should encompass the following general subjects:

1. Organization and procedures.
2. Techniques in How to Buy.
3. Engineering and Commercial Aspects of Commodities.
4. Ethics.
5. Procedural tools, such as (a) How do Conduct Meetings Effectively and (b) Effective Writing.
6. Human Relations in Supervision.

Planning the Training Program

To be most effective, every Training Program should be properly planned. This planning should include:

1. Determination as to who needs the training.
2. Selection of experts as training leaders
3. Proper training of the leaders in how to instruct.
4. Preparation of an outline of the Training Program.
5. Determination of when you will give each phase of your Training Program.
6. Provision for refresher courses or training.

Your employees who need training may be considered in the following categories:

1. Newly hired employees.
2. Employees transferred from other departments.
3. Employees transferred within the department.
4. Employees who have been on the job for some time.
5. Employees promoted to supervisors.

The training requirements for each of these employees varies considerably—and your program to fit their needs should be tailored accordingly. A sound Training Program recognizes all of these needs and provides for each of them.

Training Leaders

Your training leaders should have (1) a good knowledge of the subject, (2) broad experience, (3) leadership qualities—i. e., ability to secure and retain the confidence of the trainee, (4) open mindedness—the ability to listen and learn as well as to talk and teach, and (5) a technique to present the subject in the most helpful manner.

Methods of Training

When we speak of training, various training methods probably come to mind. Some think of lectures, some of discussion groups, others of plant visits and to others the possibility of working on the job. All of these, of course, are recognized ways of training. Each should be used when it is appropriate to the training program at hand.

Perhaps the best overall method is working on the job under the direct and close supervision of an experienced buyer. However, I believe it is essential that the buyer trainee have a rather formal schedule. Otherwise, in the rush of getting the day's work done, training is going to be pushed aside or done in a haphazard way. Also, if there is a formal training program and schedule for it, it is easier for you to discuss and evaluate the progress of the trainee.

Training On Organization and Procedures

One approach to training employees on organization and procedures would consist of the following:

1. Prepare an Outline of Your Training Program.
2. Compile your own Purchasing Manual. This Manual would be a written statement of the various policies and procedures which govern your operations.
3. Give a copy of your Training Outline and of your Purchasing Manual to each trainee at the start of your Training Program.

In preparing your Training Program on organization and procedures, it might be well to take a look at the Booklet titled "Outline of An Intracompany Training Program," as prepared by the National Association of Purchasing Agents.

Training Program Outline

This outline covers organization and procedures in a broad sense. Quoting from the text of the outline, it says "This Course covers procedural and non-technical aspects of the purchasing function. It also covers those functions closely related to purchasing, such as specifications, inspection, etc. It places particular emphasis upon the duties and responsibilities of the buyer. This outline is designed to (1) aid every employee to develop his potentialities, (2) improve the service rendered by the Company, (3) encourage participation in management planning and (4) increase understanding between management, supervisors and employees."

The following gives a brief indication of the scope of this outline (which must be adapted to each individual company's needs):

1. Organization and Management of (a) The Company and (b) The Purchasing Department.
2. Standards and Specifications.
3. Overall Control of Purchasing.
4. Selecting Sources of Supply.
5. Reviewing the Requisition.
6. Selecting the Best Supplier.
7. Conducting the Negotiation.
8. Entering Into the Contract.
9. Performance by all Parties.

The initial chapter of this outline is devoted to organization and management. It covers what most of us think

of as induction to the Company as well as Purchasing Department induction. In this chapter, they consider Company organization, including its history, corporate structure, place of your company in the industry, Company activities, Company scheme for management, Company personnel policies, delegation of authority and organization of the Purchasing Department.

The balance of the chapters in the outline deal with (1) the broad preliminary steps in Purchasing, such as Standards, Specifications, the Supply Catalog, and the overall control of purchasing, and (2) the actual detailed procedures involved in selecting sources of supply, reviewing the requisition, selecting the best supplier, conducting negotiations, entering into the contract, and finally performance by all parties, (expediting, inspection, providing transportation, paying for the purchase, and adjusting differences).

Purchasing Manual

This outline might well serve as the basis for your own Purchasing Manual. Incidentally, such a Manual is an essential working tool for every progressive Purchasing Department. I know it will take considerable effort to compile such a Manual but it certainly pays dividends.

Actually, a Purchasing Manual can be started in rather a simple fashion and expanded as time goes on to be more complete. Such a manual, for instance, would make for (1) better understanding of your basic purchasing policies and principles, (2) greater uniformity in your daily operations and (3) make your training problem much easier. Many of the questions which your new personnel have would be promptly and clearly answered by the manual. It will also free you and your more experienced buyers from the need for repeatedly handling problems which can become routine and can be handled by subordinates.

Induction at Detroit Edison

It might be of interest to consider for a moment what we use at Detroit Edison on the subject of Organization and Procedures to train our new buyers:

Companywise

Your New Job—a Booklet which tells in general about the hours of work, vacations, company management, insurance, Company jobs, some of the things the man should do and some of the things he can't do.

You Are The Company—a Booklet which tells about Utilities, the growth of our Company, the area we serve, our rates and services, and how electricity is made, transmitted and distributed.

College Graduate in Training Program—conducted by the Employment Department to (1) acquaint college men with the several departments and jobs available, and (2) to give the departments an opportunity to make a better selection of employees.

Orientation Program—conducted by our Employment Department for (1) new employees, (2) college graduates in training, and (3) older employees who have been transferred to new jobs where this background will be helpful. In this program each of our departments has an opportunity to tell what they do and how they do it, and in several cases to show the trainees actual working conditions, such as Power Plants, Substations, etc.

Departmentwise

Purchasing Department Information Booklet—which includes an Organization Chart of the Department, a brief statement of purchasing policy, and a photographic layout and pictures of the people in the department, including their names and titles.

General Order on the Purchasing Department—which establishes the responsibilities of our department.

Routine Instructions on the Purchasing Department—which is a Company document that outlines the general methods by which the procurement and other responsibilities assigned to the Purchasing Agent are carried out.

Purchasing Department Procedures—which includes our detailed procedures for each Division of the Purchasing Department: Order, Standards, Inspection, Invoice Checking, Traffic, and Salvage Sales.

How The Detroit Edison Company Buys—which is basically a magazine article covering our purchasing practices.

140 Reasons For A Purchasing Department—which is an analysis of certain purchasing functions.

Our Standards Catalog—which is an illustrated Catalog of our standard items, both stock and non-stock items.

Techniques In How To Buy

As the man progresses, we should have a definite program to teach him the techniques of buying. These techniques are more than a mere knowledge of the routines and mechanics of buying. Rather they are some of the more technical aspects of purchasing and include knowledge on:

1. Buying the right quantity.
2. Buying the right quality.
3. Buying at the right price.
4. How To Buy (including such tools as purchase and cost analyses, for example, determination of manufacturing differentials for wire and cable).
5. When to buy, based on economic and market conditions.
6. Relationships with suppliers.
7. Relationships with other departments.
8. Techniques of the interview.
9. Legal aspects of buying.
10. Arranging for technical information required by engineering and using departments.
11. Introducing new products.
12. Developing new products and new sources.

Many of you are probably thinking that you are doing a good job in teaching these subjects to your new buyers. I would like to suggest, though, that you take another look at this. You are quite apt to find, as we did, that there is considerable room for improvement. In fact, we are starting a series of meetings after hours with our new buyers and with new personnel in other divisions of the Purchasing Department, who are also interested in the buying activity. These meetings will consist of a presentation of the subject followed by a round table discussion.

Engineering and Commercial Aspects of Commodities

A good Training Program should cover the engineering and commercial aspects of commodities. A real buyer must have more than a superficial knowledge of what he is buying. He needs to know the basic sources of his raw materials, including the regions where they are produced and the principal producers. He also must know about the basic steps in their fabrication and how they affect availability, quality and price. Further, such fundamentals as production demand, supply reserves, and future outlook are important for such basic electric company materials as copper, lead, and steel. These factors are likewise important for material used in lesser volume but none the less critical in terms of our requirements.

Considerable help on this problem of the engineering and commercial aspect of commodities can be obtained from visits to manufacturers' plants and to your own operating plants and construction jobs. Additional help is available from (1) the N.A.P.A. Handbook on "Commodities," (2) Brady's Materials Handbook, (3) the N.A.P.A. Commodity Research Studies on copper, lead, pig iron, rubber, etc., (4) Vendors' Catalogs and other technical literature, (5) Technical books from your Company or Public Libraries, (6) Reports of the American Bureau of Metal Statistics and from trade associations such as Copper Institute, and (7) last but not least, from salesmen from your major sources of supply.

Ethics

It is important that we teach the proper kind of ethics to our new buyers. These are important fundamentals that everyone should know. They are not new to you but I believe all of us could

profit by periodically reviewing them. They are:

Purchasing Objectives

To buy the right item.
In the right volume.
At the right time.
From the right source.
At the right price, and
To be delivered at the right time.

Purchasing Policies

1. Courteous treatment for everyone.
2. Every deal must be a two-way proposition—good for us and good for the vendor.
3. All prices quoted are kept confidential and are not used as a lever to reduce another vendor's price.
4. Obtain vendor's best price first.
5. Respect our contractural and moral obligations.
6. Avoid sharp practices.
7. Don't take unfair advantage of a contract that has become inequitable.
8. Develop maximum qualified competition.
9. Deal with reputable and dependable sources.
10. Be receptive to the counsel of using departments, reliable vendors, other utilities and other reliable sources.
11. Know the product so as to "buy" rather than "write orders."
12. Promote the interests and policies of the Company.
13. Buy without prejudice.
14. Promote honesty and truth in buying and selling.

Also, included under the subject of ethics are (1) consideration of the obligation of the buyer to his own company, (2) obligations to the vendor, (3) satisfactory vendor relations, (4) fair vs. sharp purchasing practices, and (5) promoting good will for your Company.

Procedural Tools

We have found several procedural tools which are of considerable help to our buyers. These are:

1. Training in How to Conduct Meetings Effectively.
2. A course in Effective Writing, and
3. A course in Effective Reading.

We give our buyers a booklet titled "Making the Most of Your Meetings." This has been very helpful in improving the quality of the meetings they conduct and also in keeping them on the beam so that we spend our time at meetings more effectively.

Effective Reading and Writing

We have given all the men in our department a course in Effective Writing. This course does not teach grammar—rather it indicates what factors make for easier reading and understanding. Our course was based on the work of Rudolph Flesch and parallels his book titled "The Art of Plain Talk."

We modified his Readability Yardstick slightly to fit our conditions. This Yardstick is a useful tool to (1) indicate how readable your present writing is and (2) to measure your progress from time to time in applying effective writing principles. As a result of this course, we have improved the quality of our letters and we are turning out much more effective writing, both for internal and external correspondence.

Another tool which is of considerable help is "Effective Reading." A course in this subject not only increases the rate at which you can read but also increases your comprehension of what is being read. Without any effort, your reading speeds can be doubled and at the same time comprehension of what you're reading is increased. These results are particularly helpful to buyers who necessarily must read a lot in the course of their day's work.

Human Relations In Supervision

When a buyer is promoted to a supervisory job, it is essential that he be given training in Human Relations. Many outfits are now doing this. In general, these training courses supply principles of human behavior which are useful in the personnel phase of the supervisor's job. They also furnish opportunities for the development of skill in applying these principles.

In addition, the same sort of training can be given with considerable profit to all of our buyers. After all, much of their success depends on their ability to deal effectively with people within and outside the company. Any assistance that we can give them to aid them in bettering their relationships with people will be very worthwhile.

Evaluating the Man

How do we determine, as we go along in the training program, whether or not the trainee will make a buyer? Again there is no exact science. We of Detroit Edison have found from experience that at least one-third of the men we have selected for buyer's jobs, after considering all of the factors and after putting them through our training course, have in our opinion failed to make the grade.

According to the survey, no one apparently evaluates training given to employees after they have passed their probationary period. It seems to me that it is just as important to evaluate this training as it is your earlier training. Actually, I imagine all of you are doing this evaluating but you are thinking of it in terms of the progress the man shows on his job. For example, Wisconsin Electric Power indicate they consider the following factors when evaluating progress:

1. *Supervision*—Consider the amount of supervision required to do work properly.
2. *Learning Ability* — Consider speed in which new routine or explanations are mastered.
3. *Initiative*—Can he think along original lines and handle assignments without detailed instructions?
4. *Attitude and Interest*—Does employee like the work?
5. *Work Habits*—Does he stay at the job? Does his attention wander?
6. *Judgment*—Does he think and make decisions logically?
7. *Cooperation*—Does he work well with others?
8. *Quality*—Is he accurate regardless of volume?
9. *Quantity*—Consider volume under normal conditions regardless of errors?
10. *Potential Supervisory Ability*—Consider his apparent ability to organize and lead?
11. *His Future Possibilities*—Consider possibility for advancement. How near is he to the limit of his efficiency?
12. *Emotional Stability* — Does employee's excitability or emotions interfere with work.
13. *Health Record*—Absences or effect on work.
14. *Punctuality*—Reporting to work.
15. *Change*—General change since the last rating.

Supervisor's Recommendations

If an employee is rated rather low on several characteristics, the supervisor indicates under the heading of "weak points" what action has been taken or he recommends to be taken to improve or correct these weaknesses. Similarly under the heading of "strong points," the supervisor comments on abilities that have not been fully developed as yet or on abilities that cannot be used on the present job. These, of course, will suggest the desirability of additional training or point to the need for considering the employee for a better job.

Organized Program Needed

In conclusion, I would like to say that all of us, I'm sure, are doing a training job. However, we are handicapping ourselves by not having a complete and formally organized program.

There are many advantages to be gained by formulating a definite and positive training program for buyers, putting it into action, and following up to see that it works. It's up to each of us to do something to put these advantages to work for us.

Operating Characteristics of Heat Pump Ground Coils*

A Rational Correlation

By Dr. W. A. Hadley
Columbia University

During the past two years the Joint AEIC-EEI Heat Pump Committee has been attempting to correlate the operating data of test heat pump installations. The correlation given in this report is the result of this effort. It is hoped that the correlation will serve to stimulate discussion, to demonstrate that further research is needed, and serve as a basis for selecting specific research projects.

Editor's Note: The correlation included as part of this report to the Joint AEIC-EEI Heat Pump Committee is based on the data obtained from some of the experimental heat pump installations, using the earth as a source of heat, described in the August, 1949, BULLETIN. The correlation is compared with an application of the Kelvin Line Sink Theory. It should be understood that neither the author nor the committee is at this time prepared to state that such a correlation represents a definitive method for arriving at the size of ground coil for a heat pump system. The results obtained indicate that practical results are better than could be expected from early theoretical considerations.

At the present time, heat pumps employ as a source of heat the outdoor air, water from wells or streams, or the earth. There is very little design information available if the earth is selected as the heat source and there is much fundamental work that should be done in this field. Nevertheless, experimental data is available on ground coils and the present study was undertaken to provide more reliable design information based on rational studies of this experimental data.

The study does not include comparisons with outdoor air or water as a source nor the problems of optimum length of the ground coil, pipe diameter or whether the ground coil should be installed vertically or horizontally. In some cases the question can probably best be answered at the present time by economic considerations alone. For example, if the soil is rocky and does not permit a pipe to be driven into the ground economically at low cost, then horizontal installation is indicated.

Furthermore, it should be noted that most of the test installations correlated were coincidentally located in the northern part of the United States and this should be borne in mind when the data are utilized.

The design procedure was obtained in the following manner. Test results from several experimental ground coil installations were correlated. The correlation was made through a dimensional analysis of the factors affecting ground coil operation which yielded two dimensionless ratios:

$$\frac{q}{(\Delta t)(k)(Ft)} \quad \text{and} \quad \frac{d^2}{\alpha\theta}$$

$\frac{d^2}{\alpha\theta}$ is customarily called Fourier's Number, N_{Fo}

in the above:

d = diameter of ground coil pipe, ft.

α = thermal diffusivity of soil = $k/\rho C$

k = thermal conductivity of soil, BTU/(Hr) (ft²/ft) (°F)

ρ = density of the soil, lbs/ft³

C = Specific Heat of soil, (BTU)/(lb) (°F)

θ = total elapsed time since the beginning of the heating season as determined by local conditions to the design point (Feb. 1)

q = heat transfer rate to the ground coil (BTU)/(Hr) (a 4-week average at peak of heating season for on-off control heat pumps) see Fig. 6.

Ft = length of ground coil, ft.

Δt = temperature difference between ambient earth and ground coil at time θ, °F

In Fig. 1 the dimensionless ratios, calculated from the experimental results, are plotted. The curve drawn through these points was determined in the following manner.

If the higher powered terms are neglected, the Kelvin Line Sink Theory as developed by Ingersoll and Plass[1]* indicates that the relationship between these ratios should take the following form:

$$\frac{(\Delta)(k)(Ft)}{q} = A\log_{10}(1/N_{Fo}) + B$$

where "*A*" and "*B*" are constants. This

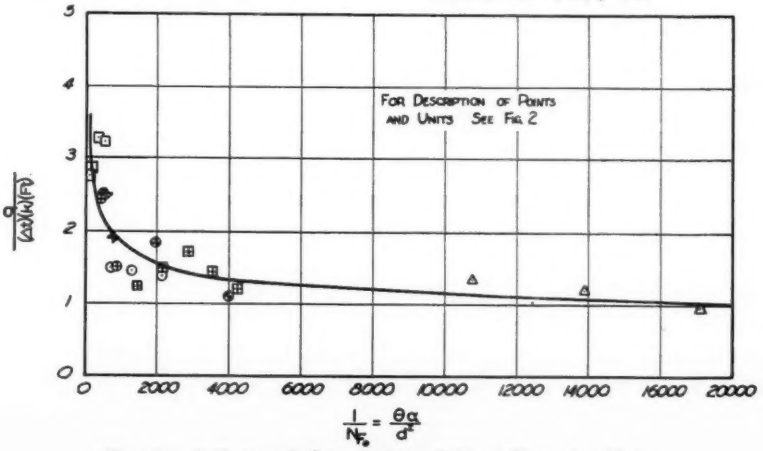

Fig. 1—A Rational Correlation of Heat Transfer Rates to Buried Ground Coils

* For all numbered references see Bibliography at the end of this report, p. 461.

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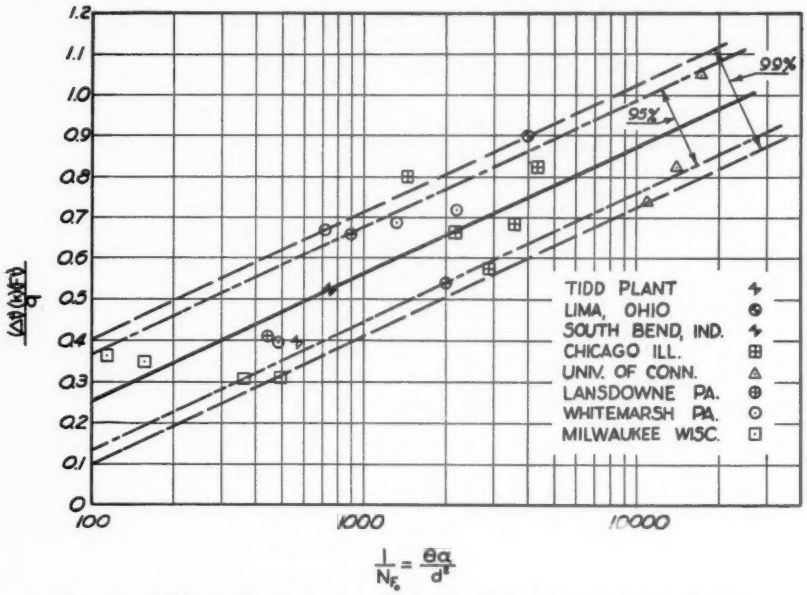


Fig. 2—A Plot of Experimental Data (From the Sources Listed Below) Versus Two Dimensionless Ratios

Point Designation	*Heat Pump Installation*
Tidd Plant	American Gas & Electric Assn., Tidd Installation, Brilliant, Ohio
Lima, Ohio	American Gas & Electric Assn., Lima Installation, Lima, Ohio
South Bend, Ind.	American Gas & Electric Assn., South Bend Installation, South Bend, Ind.
Chicago, Ill.	Commonwealth Edison Co., Chicago Installation, Chicago, Ill.
Univ. of Conn.	Connecticut Light and Power Co., University of Conn. Installation, Storrs, Conn.
Lansdowne, Pa.	Philadelphia Electric Co., Lansdowne, Installation, Lansdowne, Pa.
Whitemarsh, Pa.	Philadelphia Electric Co., Whitemarsh Installation, Whitemarsh, Pa.
Milwaukee, Wisc.	Wisconsin Electric Power Co., Milwaukee Installation, Milwaukee, Wisc.

results in a straight line relationship between the ratios when plotted on semi-log paper.

This is plotted in Fig. 2 and by statistical methods the best straight line through these points has been determined and is shown on Fig. 2 as a solid line. This line is the line replotted on Fig. 1. The constants for this line are:

$$A = + 0.311$$
$$B = - 0.3696$$

A comparison of Line Sink Theory with this rational mean is shown in Fig. 3. The Line Sink curve in this case includes the higher powered terms of Ingersoll and Plass which were neglected above. Fig. 3 illustrates t fact that pure Line Sink Theory, usi laboratory measured conductivities, ten to predict conservative values for desi purposes which in some cases may over-conservative.

As only a relatively few points we available as a sample to determine t mean line, fiducial limits were calcula by statistics and are plotted as brok lines on Fig. 2. The limits labeled per cent are to be interpreted as follow "If it is stated that the true aver curve falls between these limits, t probability of being misled by the p ticular sample of data used is one cha in 100. Likewise the 95 per cent lim are subject to an error of 1 in 20."

Some of the scatter of the points m be attributed to the diverse nature the test installations correlated. I cluded in the sample are vertical a horizontal coils, closely spaced a widely spaced coils, and runs abo freezing temperatures and below. data become available from other t installations, it will not be necessary use several points for each of seve months from a single installation. T may materially reduce the scatter of points.

It should be noted on Fig. 2 that points from each installation tend bracket the mean curve, apparently lowing the ambient temperature va tion of the soil somewhat below the d A closer correlation may result by us only the data for January, when a su cient amount of January data are av able. Therefore, for design calculat

TABLE I—DATA FOR PLOTTING CURVES BASED ON TWO DIMENSIONLESS RATIOS DERIVED FROM A CORRELATION OF EXPERIMENTAL HEAT PUMP GROUND COIL INSTALLATIONS

Heat Pump Installation	q/Ft	t	k	α	d	d^2	θ	N_{Fo}	$\frac{q}{Ft\Delta t\ k}$	N_{Fo}	$\frac{\Delta t\ k\ Ft}{q}$
Tidd	50.8	22.0	.92	.0275	.198	.0392	816	.00175	2.51	571	.398
Lima	11.0	13.0	.764	.0171	.0938	.0088	2064	.00025	1.11	4000	.900
South Bend	60.5	35.0	.906	.0307	.198	.0392	960	.00133	1.91	751	.524
Wisconsin	35.1	21.0	.51	.0148	.291	.0847	2088	.00274	3.28	365	.305
Wisconsin	36.4	22.0	.51	.0148	.291	.0847	2832	.00202	3.24	495	.308
Wisconsin	32.2	22.0	.51	.0148	.291	.0847	912	.00628	2.87	159	.348
Wisconsin	31.7	22.6	.51	.0148	.291	.0847	744	.00873	2.75	114	.363
Chicago	33.1	34.0	.78	.0180	.136	.0185	1464	.000701	1.25	1428	.800
Chicago	33.5	30.0	.78	.0180	.136	.0185	2208	.000464	1.50	2155	.666
Chicago	33.9	25.0	.78	.0180	.136	.0185	2952	.000348	1.74	2875	.575
Chicago	25.1	22.0	.78	.0180	.136	.0185	3648	.000282	1.46	3540	.685
Chicago	20.9	22.0	.78	.0180	.136	.0185	4392	.000234	1.22	4270	.820
Phila (L)	4.34	2.5	.712	.0166	.1585	.0251	672	.00225	2.44	444	.410
Phila (L)	6.5	6.0	.712	.0166	.1585	.0251	1344	.001125	1.52	888	.658
Phila (L)	15.8	12.0	.712	.0166	.1585	.0251	3024	.00050	1.85	2000	.540
Phila (W)	6.3	3.5	.69	.018	.1585	.0251	672	.00207	2.51	483	.398
Phila (W)	6.22	6.0	.69	.018	.1585	.0251	1008	.00138	1.50	725	.666
Phila (W)	13.6	13.5	.69	.018	.1585	.0251	1848	.000755	1.46	1325	.685
Phila (W)	9.1	9.5	.69	.018	.1585	.0251	3024	.000461	1.39	2170	.719
Conn	25.2	20.0	.93	.0214	.0728	.0053	2664	.000093	1.355	10750	.738
Conn	30.4	27.0	.93	.0214	.0728	.0053	3456	.0000717	1.21	13950	.825
Conn	30.0	34.0	.93	.0214	.0728	.0053	4224	.0000586	0.95	17090	1.05

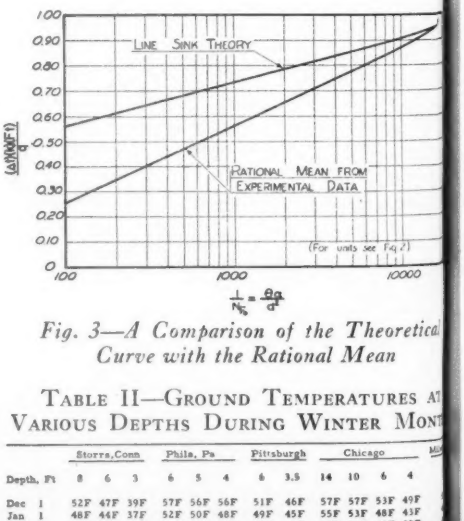


Fig. 3—A Comparison of the Theoretical Curve with the Rational Mean

TABLE II—GROUND TEMPERATURES AT VARIOUS DEPTHS DURING WINTER MONT

		Storrs, Conn			Phila, Pa			Pittsburgh		Chicago			
Depth, Ft		8	6	3	6	5	4	6	3.5	14	10	6	4
Dec	1	52F	47F	39F	57F	56F	56F	51F	46F	57F	57F	53F	49F
Jan	1	48F	44F	37F	52F	50F	48F	49F	45F	55F	53F	48F	43F
Feb	1	44F	42F	35F	48F	47F	46F	46F	41F	53F	50F	43F	39F
Mar	1	42F	41F	37F	-	45F	-	43F	39F	51F	47F	42F	37F
Apr	1	45F	45F	45F	-	48F	-	42F	38F	48F	46F	43F	42F

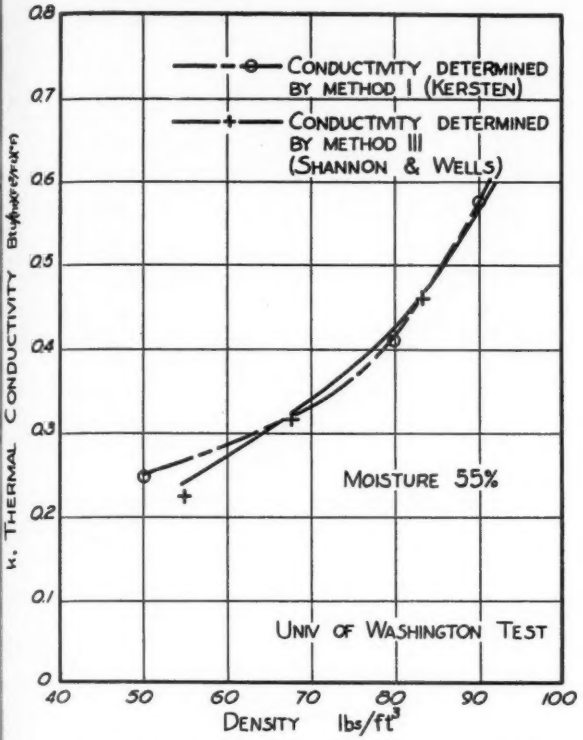

CONDUCTIVITY DETERMINED BY METHOD I (KERSTEN)
CONDUCTIVITY DETERMINED BY METHOD III (SHANNON & WELLS)
MOISTURE 55%
UNIV OF WASHINGTON TEST
k, THERMAL CONDUCTIVITY
DENSITY lbs/ft³

Fig. 4—Conductivity Versus Wet Density—Soil 1S

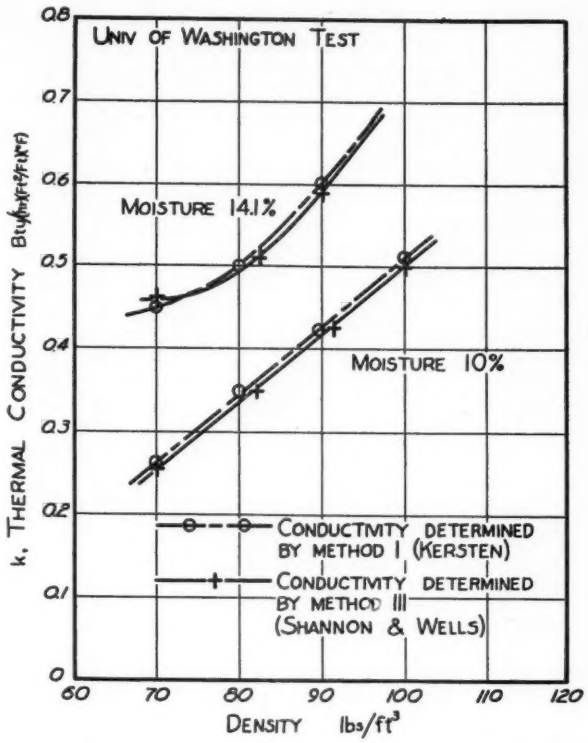


Fig. 5—Conductivity Versus Wet Density—Soil 4M

a factor of safety should be included and one of the upper fiducial limits of Fig. 2 used in place of the mean value.

The Method of Obtaining the Plotted Data

The data from which the curves were plotted is given in Table I.

The values for q/Ft are average values when intermittent operation was encountered and averaged over the preceding 4-week period (or month depending on the method of presenting the data). A 4-week period average was selected in this case instead of the much larger daily average because the ground apparently acts as a thermal flywheel and short duration peaks are ironed out in a relatively short time. A correlation was attempted with the daily average and found to be less successful. For this reason the heat transfer rates plotted are, in general, not the maximum rates the coil delivered for that period (see Fig. 6) and conversely, coils designed with this data should be able to deliver similar peaks.

An attempt was made to select points covering the period when the heat pump was operating at its greatest capacity so that the resulting curve would apply to the peak of the heating season. No attempt was made to differentiate the closely spaced coils from the others.

The temperature difference is that existing between the ambient earth and the coil fluid at the time selected. Faired values for the ambient earth temperatures were used when available.

Table II shows ground temperatures at various depths during the winter months for installations at Storrs, Conn., Philadelphia, Pa., Pittsburgh, Pa., Chicago, Ill., and Milwaukee, Wis., based on information taken from the various reports used in this correlation.

The values for thermal conductivity and thermal diffusivity were determined by the method of Shannon and Wells[2]

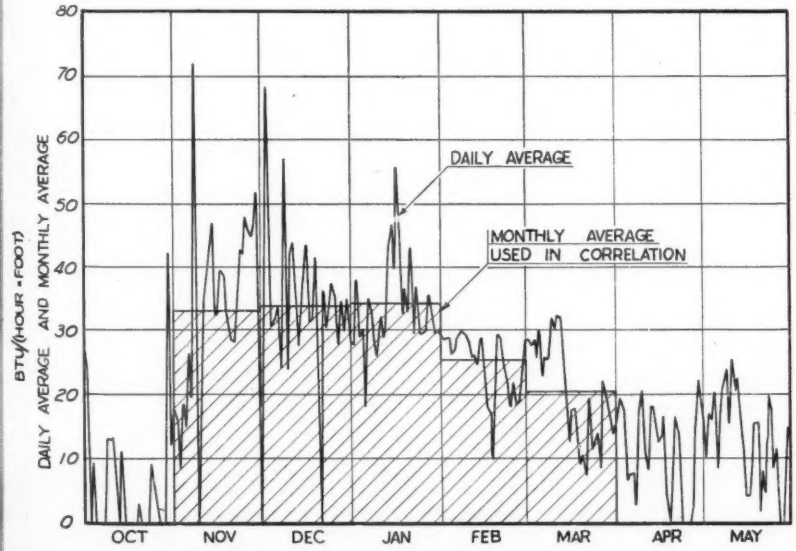


Fig. 6—Typical Average Daily and Monthly Rates of Heat Extraction

Data taken from Report by Utilities Research Commission; Committee No. 94; Feb. 1, 1949, entitled "Heat Sources in the Chicago Area for the Heat Pump." Investigation conducted by A. P. Larson, Testing Department, Commonwealth Edison Co., Chicago, Ill.

Thermal Conductivity Vs. Per Cent Moisture for Earth Samples From Installations Concerned in This Report

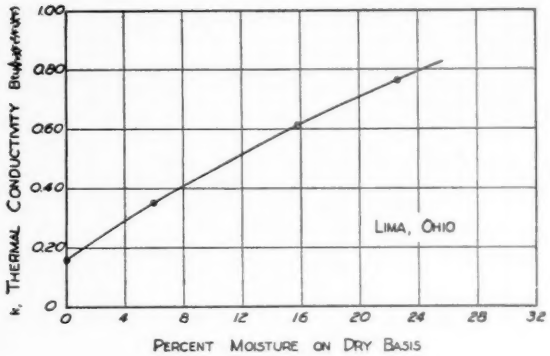


Fig. 7

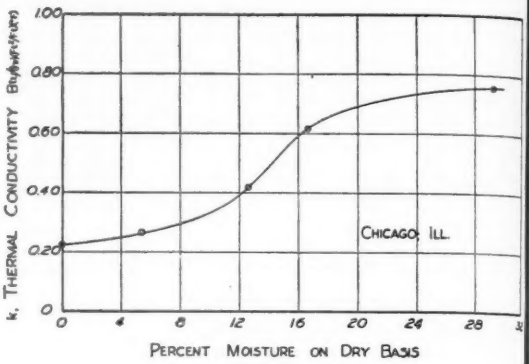


Fig. 8

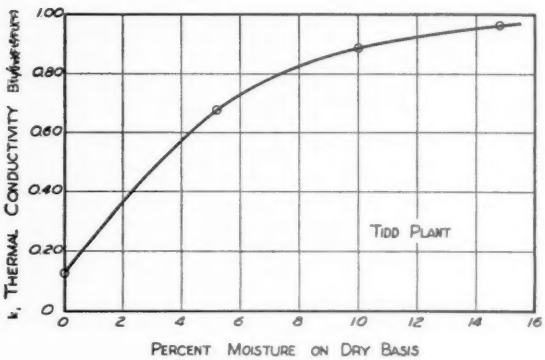


Fig. 9

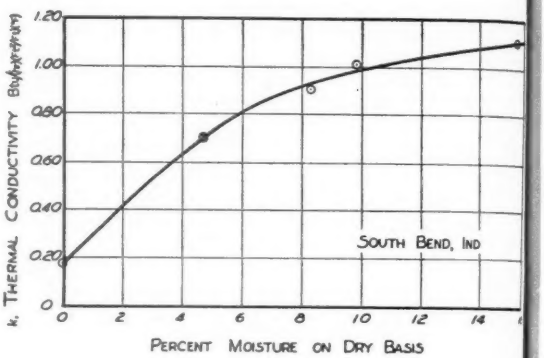


Fig. 10

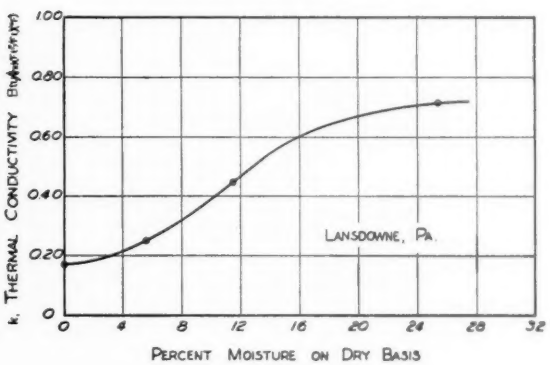


Fig. 11

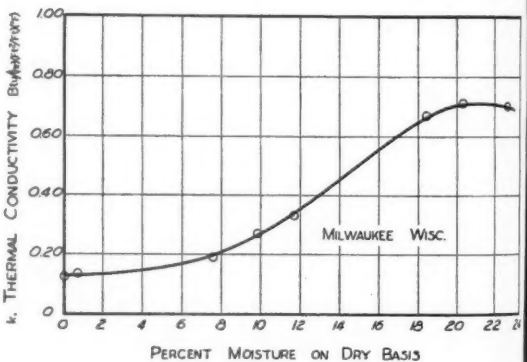


Fig. 12

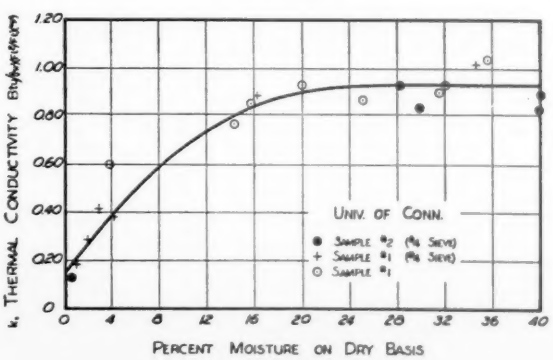


Fig. 13

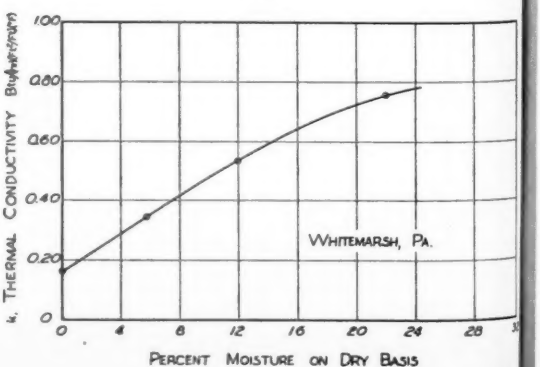


Fig. 14

TABLE III—SOIL THERMAL CONDUCTIVITY TEST RESULTS

Heat Pump Installation	Moisture Content, Per cent on Dry Basis	Thermal Diffusivity Ft^2/Hr α	Density Lb/Ft^3 ρ	Specific Heat Btu/lb-°F C	K Thermal Conductivity Btu/(Hr) $(Ft^2/Ft)(°F)$
Amer Gas & Elec Assc	0	0.0086	93.9	0.200	0.162
Tidd Installation	5.2	0.0255	110.1	0.240	0.674
Brilliant, Ohio	10.0	0.0276	117.0	0.273	0.882
(Sand and gravel)	14.8	0.0268	118.3	0.303	0.960
Amer Gas & Elec Assc	0	0.0087	93.3	0.220	0.178
Lima Installation	6.0	0.0128	102.9	0.264	0.347
Lima, Ohio	15.8	0.0172	116.1	0.306	0.611
(Clay)	22.6(near Saturation	0.0171	123.7	0.362	0.764
Philadelphia Elec Co	0	0.0099	91.6	0.200	0.181
Whitemarsh Installation	5.8	0.0145	96.9	0.244	0.343
Whitemarsh, Pa	12.0	0.0176	105.0	0.286	0.533
Clay 68%, Sand 21%	22.0(near Saturation	0.0178	122.5	0.346	0.755
Philadelphia Elec Co	0	0.0103	83.5	0.200	0.171
Lansdowne Installation	5.6	0.0118	87.6	0.243	0.251
Lansdowne, Pa	11.5	0.0156	101.9	0.282	0.447
(Clay 47%, Sand 38%	25.4(near Saturation	0.0166	118.8	0.361	0.712
Wisconsin Elec Pr Co	0.415	0.00775	85.8	0.190	0.127
Milwaukee Installation	7.6	0.00874	87.5	0.248	0.190
Milwaukee, Wisconsin	9.85	0.0118	87.0	0.263	0.270
(Clay)	22.8	0.0175	116.6	0.341	0.696
	.678	0.00783	89.5	0.200	0.137
	20.25	0.0187	116.7	0.326	0.711
	18.4	0.0178	119.0	0.316	0.670
	11.7	0.0117	102.5	0.275	0.330
American Gas & Elec Assc	0	0.0089	97.8	0.200	0.174
South Bend Installation	4.7	0.0274	109.3	0.236	0.706
South Bend, Indiana	8.3	0.0307	119.6	0.261	0.906
	9.8	0.0329	122.1	0.272	1.092
	15.5(near Saturation	0.0291	123.1	0.308	1.104
Utilities Research Commn	0	0.00993	125.8	0.180	0.225
Chicago Installation	5.54	0.01192	100.2	0.223	0.266
Chicago, Illinois	12.59	0.01482	104.0	0.272	0.418
(Clay)	16.6	0.01798	115.5	0.297	0.616
	29.4	0.01730	119.2	0.368	0.759

at the moisture content of the ambient earth. The ambient earth conditions were selected instead of the earth surrounding the coil because the latter is not available prior to the installation of the heat pump. Figs. 4 and 5 from the University of Washington, show that there is good correlation between the method of Shannon and Wells and the method of Kersten.[3]

Figs. 7 through 14 are plots of the thermal conductivities of the various soil samples as determined by the method of Shannon and Wells for this report. They were determined by the author, the University of Connecticut and the American Gas and Electric Service Corp. Test data for these curves are shown in Table III.

The time of operation, θ, is the total time in hours that has elapsed since the heat pump was started at the beginning of the heating season.

BIBLIOGRAPHY

1. "Theory of the Ground Pipe Heat Source for the Heat Pump," by Ingersoll, L. R. and Plass, H. J. *Heating, Piping and Air Conditioning,* July, 1948, p. 119.
2. "Tests for Thermal Diffusivity of Granular Materials" by Shannon and Wells, *Proc. of Am. Soc. for Testing Materials,* Vol. 47, 1947, p. 1044.
3. "Determination of Thermal Properties of Soils for Investigation of Air Field Construction in Arctic and Subarctic Regions" by Miles S. Kersten, Univ. of Minn.

Seminars Broaden Understanding Between Colleges and Industry

(*Continued from page* 452)

these questions will apply only to our own future course of action, of course. But it seems fair to assume that such gatherings, whether or not they are carried on regularly under a fixed schedule, have a value in developing a broader field for recruitment of qualified personnel and secondarily, in showing how typical companies operate under our system of free business enterprise.

Therefore, it is quite possible that other business-managed power companies and, in fact, industry in general might find meetings of this type worthy of consideration.

We are confident that within the narrow scope of our seminar, we were able to answer many of the objections of undergraduates which were revealed in our survey more than two years ago. At the very least, we were able to counteract the fairly sizeable proportion of objections which stemmed mainly from ignorance. We are satisfied that very often the plain unvarnished facts will do more to help our cause than anything else.

This does not imply that the power business has suddenly become a paradise at the end of a rainbow, free of all faults, with a pot of gold for everyone. No one in it is going to get rich quick.

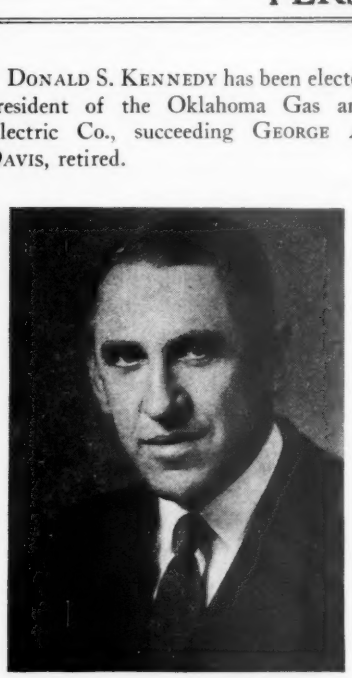
But neither is our business a fusty, stodgy back number with nothing to offer young men of ambition and vision.

We need constantly to work toward increasing the attractiveness of our industry. At the same time, we need to draw attention to the undoubted advantages already existing in our business. These advantages are not all on the side of security, either. We can boast about plenty of color and romance and "zip." Our business is in the forefront of the march toward better living, and everyone in it deserves recognition for his contribution.

We look to colleges such as those represented at our seminar for a good share of our future executives. While these young men are still in school, however, we think we can help their training by passing on some of the fruits of our experience. And we hope, through ever closer contact with college representatives, to increase their awareness of our mutuality of interests.

PERSONALS

DONALD S. KENNEDY has been elected president of the Oklahoma Gas and Electric Co., succeeding GEORGE A. DAVIS, retired.



MR. KENNEDY

Mr. Kennedy was employed as a clerk by the OG&E in July, 1923, coming directly from the University of Arizona with a degree in accounting and economics. He worked in various capacities in the Oklahoma City office until July, 1928, when he was named Eastern Division auditor with headquarters at Muskogee, Okla. In November, 1940, he was returned to Oklahoma City as assistant treasurer and in January, 1942, was elected treasurer. The following May he became vice president and a member of the Board of Directors. In October, 1948, he was elected executive vice president, which position he occupied when elevated to the presidency.

Mr. Kennedy was born in Rushville, Ind., in 1902. He received his early education in the public schools at Indianapolis. He attended Butler University two years before entering the University of Arizona. He is a member of Phi Delta Theta fraternity.

General Davis who has been president of the company since January 1, 1942, came with OG&E early in 1920. Mr. Davis has also served the state, without pay, as adjutant general under three governors. He served one term as department commander of the American Legion. He will remain a member of the Board of Directors of OG&E.

HENRY P. SARGENT, president of Central Arizona Light & Power Co., will also be president of his company's newly formed subsidiary, Northern Arizona Light & Power Co. WILLIAM P. REILLY, former president of The Arizona Power Co. from which the northern facilities were purchased, is vice president and general manager of the subsidiary.

MR. SARGENT

MALCOLM M. BRIDGEWATER, former general superintendent of Tapco, was named vice president and general superintendent of Northern Arizona, and L. V. SEARES, former Tapco secretary-treasurer, secretary and assistant treasurer.

Mr. Sargent went to Central Arizona in 1946 from Mississippi Power & Light Co., of which he had been vice president and general manager. He had joined Mississippi P&L in 1927 as an engineer. He served six months as Central Arizona executive vice president and then was elected president.

Mr. Reilly joined the staff of Ebasco Services Inc. when it was organized in 1937. He was assigned to the Washington office in 1941 and four years later became Washington office manager. He was elected Tapco president in 1948.

E. P. HENNEK, formerly executive vice president, has been elected president of the Western Light & Telephone Co., Kansas City, Kans. He succeeds ARTHUR L. MULLERGREEN, who has been named chairman.

Mr. Hennek has had a broad background of experience in the electric utility business. Starting with the Iowa-Nebraska Light & Power Co. in 1928 he was engaged for several years in power plant construction work. In 1931 he was appointed Seward district superintendent and in 1932, industrial engineer with headquarters at Lincoln, Neb., and later served as Lincoln district superintendent.

MR. HENNEK

In 1944, he was promoted to the position of general superintendent for the Iowa-Nebraska Light and Power Co. and assumed that same title for the Central Electric & Gas Co. after its acquisition of the Iowa-Nebraska properties. In 1948, Mr. Hennek was appointed executive vice president of the Western Light & Telephone Co.

FRANK W. FUNK has been elected a vice president of Ohio Edison Co. For the past 18 years he has been chief engineer and in charge of the company's production and transmission department.

Mr. Funk graduated from Ohio State University in 1908 with a degree in electrical engineering. Following graduation he went to the electrical construction department of the West Penn Electric Co. and later to the Westinghouse Manufacturing Co. In 1912 Mr. Funk went to Akron with the Northern Ohio Traction and Light Co., a predecessor of Ohio Edison. He represented the company in the engineering of the first white way and incandescent lighting system in Akron.

In 1914 he joined the Penn-Ohio Power and Light Co. in Youngstown as electrical engineer in charge of engi-

neering and construction. From 1919 to 1925 he engaged in private practice as a consulting engineer, and returned to the Penn-Ohio system in 1926 as general manager of Youngstown properties. In 1931 Mr. Funk returned to Akron as chief engineer and in charge of production and transmission.

Mr. Funk is a member of the American Institute of Electrical Engineers and the Ohio Society of Professional Engineers.

J. Lee Rice, Jr., treasurer of West Penn Electric Co., has been elected a vice president of the holding company. He has been a director since 1946.

Mr. Rice served with the Associated Gas & Electric Co. System in financial and treasury work from 1925 to 1944. He was elected treasurer of Associated G&E and most of its important subholding companies in 1939.

In 1944 he joined American Water Works & Electric Company, Inc., and in 1945 became treasurer of that company and its electric holding company subsidiary, West Penn Electric. He remained with the latter company after dissolution of the parent.

Mr. Rice is also a vice president, director, and member of the executive committee of Potomac Edison and a director of West Penn Railways Co., both West Penn Electric subsidiaries.

W. H. Swinney has retired as vice president and controller of West Penn Power and Railways Companies.

Mr. Swinney, a native Texan, joined West Penn as controller in 1927 after serving in staff accounting positions with other concerns. He was named a vice president in 1939, and a director in 1943.

Active in state and national organizations, Mr. Swinney is a past president of the Pennsylvania Electric Association, has held committee chairmanships with Edison Electric Institute, is a former national director and national vice president of Controllers Institute of America, and a member of the National Association of Cost Accountants.

M. G. Miller, assistant controller, will continue in his present position with full responsibility for the company's accounting, tax, property records, and statistical work through the heads of those departments.

Thomas G. Allan has been appointed manager, Rural Service and Dealer sections, by West Penn Power Co.

The promotion adds the responsibility of the Rural Service section, formerly managed by the late W. W. Carson, to Mr. Allan's present duties as manager of the Dealer section.

Mr. Allan started as a salesman with the West Penn Appliance Co. in 1931. In 1938, he became dealer representative in the Kittanning area and was named manager of the Dealer section in 1945.

Mr. Allan is a member of the EEI Residential Lighting Committee, Pennsylvania Electric Association Residential Committee, Electric League of Western Pennsylvania Sales Managers' Committee, and a director of the Pittsburgh Housewares Club.

Jack L. McDonald has been appointed Director of Special Services for Central Arizona Light and Power Company, Phoenix, Arizona. He will direct the utility's youth program, and will conduct a speaker's bureau and plant tour section. Prior to accepting the Central Arizona position, Mr. McDonald was New Business Manager for Arizona Edison.

A. H. Forman, Jr., formerly assistant to the vice president of Mississippi Power & Light Co. in Jackson, has been appointed assistant to the president of Central Arizona Light & Power Co., Phoenix. A graduate of Tulane University's School of Engineering, he has had more than 23 years of experience in the utility industry.

W. R. Brownlee has been appointed supervisor of power systems engineering of Commonwealth Services Inc. (formerly The Commonwealth & Southern Corp.), Jackson, Mich. He has been with the organization and an affiliated company over 20 years, his responsibilities having included load division and stability analyses, protective relaying applications, operating engineering and interconnection studies. In his new position he will direct engineering studies of power systems. Mr. Brownlee has served as chairman of the AIEE Relay Committee and is a member of the System Engineering Committee and vice chairman of the Power Coordinating Committee.

J. N. Gosinski, who has been appointed staff engineer at Jackson, Mich., has been with the organization since 1923 and most recently has been responsible for engineering studies relating to distribution system planning and operation. In his new position he will conduct load and utilization studies and economic analyses. Mr. Gosinski is a member of the EEI Transmission and Distribution Committee.

H. R. Wall has been appointed supervisor of Distribution System Engineering, Jackson, Mich. He has been associated with this organization and associated companies for 13 years, and previously with The Cleveland Electric Illuminating Co. With his present organization, he has been engaged successively in station design, technical applications and investigations, system protection, system operating problems, and system planning. During the recent war, he served as an officer of the U. S. Navy in electronics work.

A new department of electric operations and planning has been formed by Rochester Gas & Electric Corp. to supervise load dispatching and system planning. H. J. Klumb will be superintendent, with headquarters at the main office.

G. H. Fiedler will become superintendent of electric distribution, with H. A. Brown as assistant superintendent. I. G. McChesney will be assistant superintendent of electric operations and planning. W. F. Van Horn has been appointed assistant superintendent of electric and steam generation but will retain his duties as superintendent of meter laboratory, and appliance testing.

E. A. Willson has been appointed assistant to the manager of power production and system operation of the Northern States Power Co., Minneapolis, Minn. Harry P. Bruncke, formerly assistant superintendent, has been made superintendent of protection and electrical maintenance to succeed Mr. Willson.

A. J. Smalley has been appointed director of dealer and building promotion, residential sales department, Duquesne Light Co. In this capacity, Mr. Smalley will supervise dealer activities and residential building promotion.

Mr. Smalley attended the School of Business Administration, University of Pittsburgh, and entered the employ of Duquesne Light Co. as a contract clerk in 1924. He was appointed a store manager for the gas and electric shops of Equitable Sales Co. in 1930, serving in that capacity in three of the company's stores. In 1945, he was appointed supervisor of dealer promotion, the position

he held at the time of his present appointment.

ANDREW G. IRWIN has been appointed director of the market development division, residential sales department, and will supervise the sales planning activities and the development of market studies. He is a graduate of the School of Business Administration, University of Pittsburgh, and is presently associated with the university as a lecturer of commerce in the evening school.

Mr. Irwin entered the employ of the company in 1928, as a salesman for the gas and electric shops. He was appointed display manager in 1933, director of sales promotion in 1939 for Equitable Sales Co. and was transferred to the advertising department in 1945, as supervisor of research, the position he held at the time of his present appointment.

E. S. NEIGHBORS has been appointed superintendent of the electrical department of Birmingham Electric Co. He succeeds A. G. MORTON, who has been made consultant. Mr. Neighbors, a member of the American Institute of Electrical Engineers, has been with the line division for more than 20 years and with the company since 1927. Mr. Morton, who has been with Birmingham Electric since 1901, has served as supervisor of the street lighting division, head of the meter department, and superintendent of lines and meters. He also is a member of AIEE.

DUDLEY M. ARNOLD has been elected assistant secretary and assistant treasurer of Pennsylvania Power Co. Mr. Arnold started with the company in 1928 as a clerk in the rate department. In 1929, he became chief clerk of the customers accounting department in New Castle, in 1936 division auditor, and in 1942 general supervisor of customers accounting.

CHARLES E. HICKEY, manager of the outside plant construction department of Consolidated Edison Co. of New York, Inc., has retired after 41 years of service with the company. He started with the New York Edison Co. in 1905 as a meter tester and joined Consolidated Edison in 1937 as manager of the distribution operation department.

HOWARD A. HOLMES, planning engineer of the Monongahela Power Co., Fairmont, W. Va., and one-time head of the old operating and engineering department, has retired after completing more than 26 years with Monongahela and predecessor companies. Mr. Holmes joined the utility company in 1923 after an association with the Duquesne Light Co., Pittsburgh, Pa.

CONVENTIONS AND MEETINGS

1950

JANUARY

19-20 Industrial Relations Committee, EEI, Roosevelt Hotel, New Orleans, La.
30-Feb. 3 American Institute of Electrical Engineers, Winter General Meeting, New York, N. Y.

FEBRUARY

9-10 Accident Prevention Committee, EEI, Shamrock Hotel, Houston, Texas.
13-14 Electrical Equipment Committee, EEI, Netherlands-Plaza Hotel, Cincinnati, Ohio
16 Industrial Relations Committee, EEI, Palmer House, Chicago, Ill.
16-17 Pennsylvania Electric Association, Transmission and Distribution Committee, Penn-Harris Hotel, Harrisburg, Pa.
20-21 Transmission and Distribution Committee, EEI, Statler Hotel, Detroit, Mich.

MARCH

13-16 National Electrical Manufacturers Association, Edgewater Beach Hotel, Chicago, Ill.
16 Industrial Relations Committee, EEI, New York, N. Y.

APRIL

4-6 16th EEI Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill.
10-14 American Society of Mechanical Engineers, Spring Meeting, Washington, D. C.
17-19 1950 Conference of Electric and Gas Utility Accountants, Brown Hotel, Louisville, Ky.
20 Industrial Relations Committee, EEI, Netherlands-Plaza Hotel, Cincinnati, Ohio
24-26 Purchasing and Stores Committee, EEI, Schroeder Hotel, Milwaukee, Wis.
25-26 Pennsylvania Electric Association, Accounting Conference, Pittsburgh, Pa.
26-28 American Institute of Electrical Engineers, North East District Meeting, Providence, R. I.

MAY

1-4 38th Annual Meeting, Chamber of Commerce of the USA, Washington, D. C.
2-3 Electrical Equipment Committee, EEI, Edgewater Beach Hotel, Chicago, Ill.
11-12 American Institute of Electrical Engineers, Great Lakes District Meeting, Jackson, Mich.
15-18 54th Annual Meeting, National Fire Protection Association, Haddon Hall, Atlantic City, N. J.
23-26 National District Heating Association, Grove Park Inn, Asheville, N. C.
31-June 2 Pacific Coast Electrical Association, Inc., Reno, Nevada.

JUNE

5-7 EDISON ELECTRIC INSTITUTE, Annual Meeting, Atlantic City, N. J.
12-16 National Electrical Wholesalers Association, Atlantic City, N. J.
12-16 American Institute of Electrical Engineers, Summer Meeting, Pasadena, Calif.
19-23 American Society of Mechanical Engineers, Semi-Annual Meeting, St. Louis, Mo.
26-30 American Society for Testing Materials, Atlantic City, N. J.

Utah Power & Light Helps Sponsor Unique Electric Kitchen Promotion Campaign

(*Continued from page* 450)

torium, where electrical appliance displays of a number of wholesale dealers were also featured.

Winner of the All-Electric Kitc and the Jack Pot of building mate was Mrs. Bernard Z. Kastler of S Lake City. For her kitchen, Mrs. K ler chose an electric stove, an elec freezer, an electric washing machine an electric refrigerator. Many of 25 award winners in the contest rece electrical appliances as prizes, rang from electric blankets to electric ra

The sponsors of the contest felt the contest and the promotional act that accompanied it will have far-re ing effects on the future sales of e trical appliances for the home in area surrounding Salt Lake City. E before the expiration of the period the "Treasure Hunt" the Utah H Builders Association could report all the model homes on display in nection with the contest had been s

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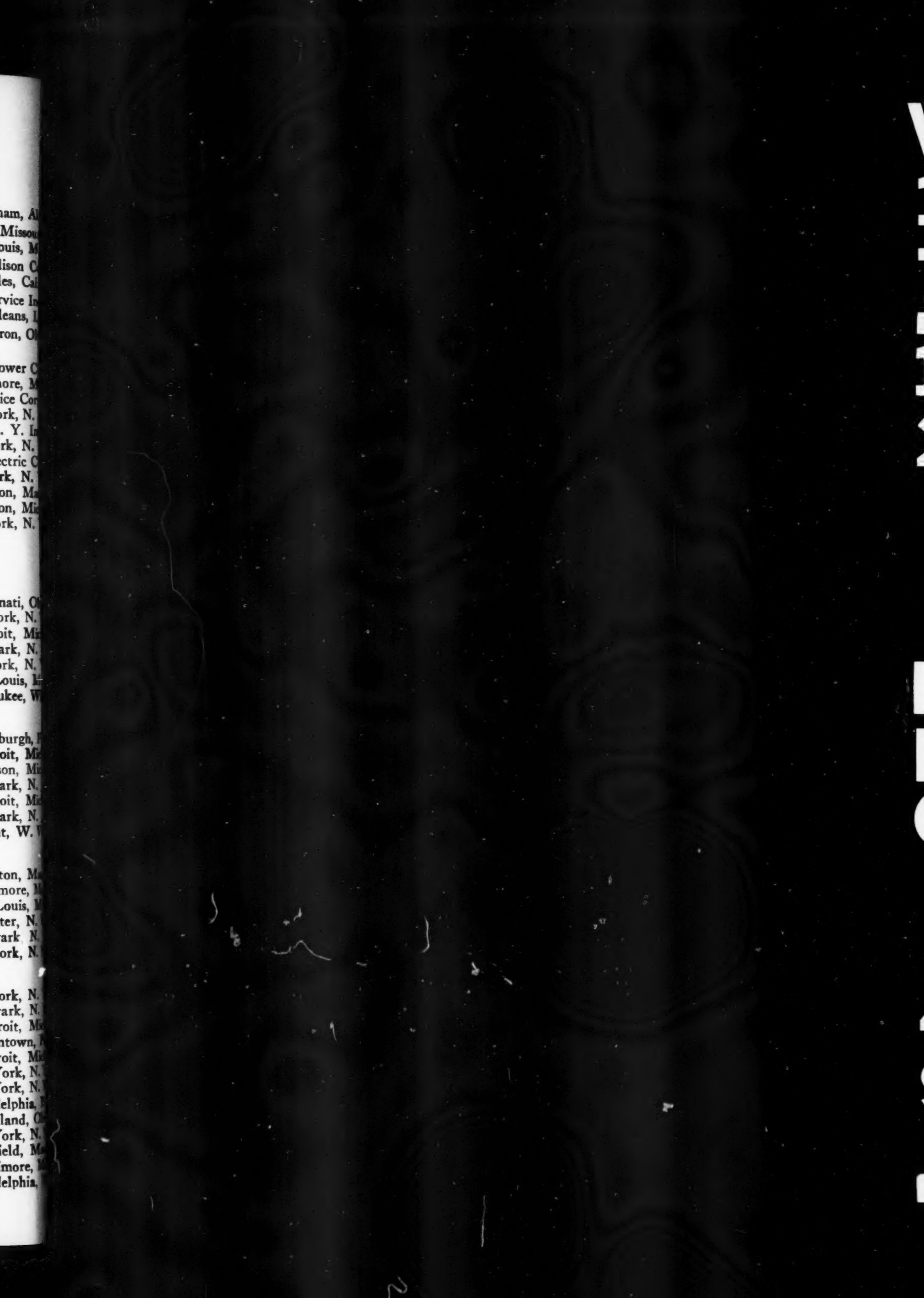
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